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MEDICAL RESEARCH IN THE UNITED STATES NAVY

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JUSTIFICATION for the program of research in the Medical Department of the Navy may be found in the answers to three interrelated questions: (1) Why do research at all? (2) why do biomedical research? and (3) why do biomedical research in the Armed Forces, specifically the Navy? The answer to the first of these arbitrarily separated questions is evident. In the early history of mankind the advances were based on trial and error, but the human spirit, as it has developed, has learned that progress is essential, progress necessarily dependent on research. This research has been conducted on principles of logical thought and is planned on intelligent hypotheses and ever advancing technics.

The answer to the second question lies in the manifold programs for the maintenance of physical and mental health. The results are shown in the great prolongation of life in recent years. And, as life has been prolonged, biomedical research is charged with making it happy, healthful, and productive. The answer to the third question is the theme of this article.

The mission of the Armed Forces is simply stated as "combat readiness." Research in weapons systems is readily accepted as essential because end items are tangible and their purpose well defined. However, the use of weapons systems is largely dependent on the men who operate them, and in the man-machine combination the weapon is only effective insofar as the man can do his job. Each must be adapted to the other and the greatest variable in the equation is the man. A broad concept of military biomedical research covers selection, training, adaptation to strange environments, and preservation of health.

Military medicine is more than medical care of military patients. It entails responsibility for discovering new ways and

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means of prevention and cure of disease and injury. It differs from civilian medicine in that it is concerned with military personnel in peace and war; it must be mobile; and it must be prepared to deal with problems which arise in the field, whether they be surgical or medical, on land, at sea, or in the air. Modern history is replete with examples of how doctors and their associates in military situations have faced these problems and have met them successfully. The control of infectious diseases such as malaria, pneumonia, and enteric diseases has altered statistics so that these disorders no longer incapacitate the fighting forces. Surgical measures have vastly reduced the incidence of death and subsequent disability following combat trauma.

It is even proposed that military medicine should be recognized as a specialty. At the Fourteenth International Congress of Military Medicine and Pharmacy held in Luxembourg in November 1954, it was agreed that, "Military Medicine is a specialty in that it encompasses a group of special considerations, aspects, or principles peculiar to the needs of the Armed Forces and because it requires of its exponents a unique combination of special knowledge and skills."

There can be no doubt that biomedical research supports the mission of "combat readiness," and it is a function of the Medical Department to forward this mode of study. It is obvious that war accelerates and augments research. It should be equally obvious that preparation for war is an important objective in peacetime. New situations arise with new types of warfare, and research between wars lays the groundwork in two ways. It provides basic and supporting data for studies applied directly to the military needs and requirements. It builds a hard core of investigators with military orientation to be the nucleus of research personnel for expanded programs necessary in time of war.

Lessons learned during war have many applications in civilian practice and, conversely, research by civilians has aided the military effort. Thus there are interrelations and correlations both ways. However, this does not alter the need for a continuing program of research carried out by medical and ancillary personnel in the Armed Forces.

NAVY INSTALLATIONS

The Bureau of Medicine and Surgery exercises management control and technical control of research laboratories. Management control includes personnel, finances, projects, and programs. Technical control covers medical aspects in association with other bureaus and agencies of the Navy. The Bureau has management control of the Naval Medical Research Institute, Bethesda, Md.; the Naval Medical Research Laboratory, New

London, Conn.; Naval Medical Field Research Laboratory, Camp Lejeune, N. C.; Naval Medical Research Unit No. 1 (NAMRU-1) in Berkeley, Calif.; NAMRU-3 in Cairo, Egypt; NAMRU-4 at Great Lakes, Ill.; clinical research in hospitals; and the proposed NAMRU-2 on Formosa. In association with other bureaus it has technical control of the research laboratory at the School of Aviation Medicine at Pensacola, Fla.; the Aviation Medical Acceleration Laboratory at Johnsville, Pa.; the Aeronautical Medical Equipment Laboratory at Philadelphia, Pa.; the biomedical aspects of the Naval Radiological Defense Laboratory at San Francisco, Calif.; the Naval Biological Laboratory at Oakland, Calif.; the Navy Mine Countermeasures Station at Panama City, Fla.; and the Experimental Diving Unit in Washington, D. C. The Dental Division has management control of the Naval Dental School and technical control at Great Lakes, Bainbridge, Md., and San Diego, Calif. It is unnecessary to catalog in detail the mission of these various facilities, because this has been done by Shaw,[1] but it can be asserted that the objectives are largely in support of naval operational needs as in submarine and aviation medicine, studies of acute respiratory diseases of recruits, and defense against atomic and biologic warfare, as well as fundamental studies in physiology, biochemistry, pathology, pharmacology, biophysics, psychology, and psychiatry.

An example of how operational needs are met is furnished by the program at Pensacola. Someone might wonder why the laboratory there conducts studies on such subjects as cosmic rays, molecular structures, and lipoproteins. These are not shots in the dark but are carefully integrated into the fitness of naval aviators from the time they are cadets until they reach the ages of limited duty and of retirement. Studies of psychiatric, psychologic, and physical factors are essential to forward training and career, to select personnel, and to evaluate them as they progress. Even methods of evaluation and grading require research. Cosmic rays may well be significant in high altitude flying. Molecular structure is important in the study of explosive decompression. The aging of pilots may be explained at least in part by quantitative determination of special lipoproteins in the blood. The causes of attrition are studied with a view to reducing it and its accompanying wastage of time and money.

Another example is Operation Hideout at New London. Some aspects of this study are still classified but more is now known of the physiology and psychic aspects of prolonged submersion in a submarine than was ever true before. Mention need only be made of the *Nautilus* to indicate the operational significance. It should be emphasized that studies preliminary to this experiment occupied the attention of the scientific staff at New London for at least three years before it was undertaken. At New London

also there have been numerous studies of hearing, of vision, of communications, of sonar operations, all directly applicable to the needs of the Navy. Color vision has been an important preoccupation with the aspects of habitability of submarines and lighting of controls, but certain other observations are of the utmost significance for air-sea rescue. Only by an intimate knowledge of the physiology of the retina could it have been learned that a modification of the color of rafts and clothing will permit recognition of castaways at sea at great distances and high plane altitudes.

DISCIPLINES OF MEDICAL SCIENCE

It is appropriate to indicate how the various disciplines and tools of medical science are used. The use of physiology is widespread. Earlier studies in aviation medicine covered the effects of altitude, hypoxia, orientation, visual perception, and communication; these are being given re-examination in relation to high performance aircraft. Other investigations are directed toward effects of acceleration. G stresses and the like are being studied, as are pressure suits and protective clothing. The facilities at Pensacola, the Aviation Medical Acceleration Laboratory at Johnsville, and the Aeronautical Medical Equipment Laboratory at Philadelphia are devoted to intensive work on these topics, and their value for the naval aviator is obvious.

The importance to submarine medicine is emphasized by the studies at New London referred to above. Equally significant are the physiologic studies connected with deep sea diving, the selection of personnel, the gases to be used, the importance of compression, and the treatment of casualties. Several installations are concerned, including the Experimental Diving Unit and those at New London and Key West. The use of physiology in clinical investigation is mentioned below.

Much of the work in physiology depends on physics and biophysics. Certainly muscular action and fatigue require an understanding of mechanisms of muscular contraction and the energies involved, as well as transmission of nerve impulses. This is an important facet of the work at Naval Medical Research Institute. The development of prostheses for amputees, the acrylic eye, the armored vest, and the Navy boot represent the fusion of physics and physiology.

Microbiology must be pursued in order to explain outbreaks of disease in the fleet, such as dysentery, and other microbial diseases both afloat and ashore. The prevention and treatment of these is a part of operational effectiveness. Perhaps as a part of this field is entomology, particularly as it applies to vectors of disease. At Bethesda, the studies of mosquitoes have

led to methods for the assay of drugs used in suppression and treatment of malaria. Other studies of entomology are applied to transmission of disease and to problems of sanitation.

Pharmacology, in the over-all sense of management and treatment of disorders incident to operations in the strange environments to which military personnel are subjected, is evidently important. Witness the efforts to prevent and cure the bodily changes incident to irradiation injury by nuclear weapons. This cannot be elaborated on because of classification. Burns solely thermal or combined with irradiation require rational management. Shock from burns, traumatic injury, and exposure requires treatment by use of fluids, including plasma extenders. The Naval Medical Field Research Laboratory and the Naval Radiological Defense Laboratory have conducted valuable studies on glycerol pectate. Other extenders have been studied in naval laboratories and hospitals. In addition to the physiologic and chemical studies of diseases endemic in the Middle East, progress has been made in treatment by means of correction of the fluid and electrolyte balance, and notably by the use of antibiotics.

Pathology is ubiquitous. In practically all laboratories and hospitals the examination of tissues serves to identify disorders. Furthermore, studies of particular stresses require the background of pathology. This covers many fields, from blast effects as at the Mine Countermeasures Station to experiments on the influence of irradiation on mitotic activity as at Bethesda. It seems apparent that studies of irradiation injury, of airborne agents, of the action of cosmic rays, and like investigations of military significance would be incomplete, and indeed uninformative, without the aid of the pathologist and his technics.

Psychology, psychiatry, and related fields have their special methods. A few of the unclassified projects will indicate the importance to the military forces. Examples are projects on psychologic studies underlying naval problems; studies on the etiology, prevention, diagnosis, treatment, and rehabilitation of neuropsychiatric casualties; the psychiatric evaluation and assessment of Marine Corps officer candidates; an exploratory study of the implications of psychiatry on certain perceptual phenomena and their apparent explanation; studies for the purpose of screening potentially neurotic inductees; and investigation of requisite personality traits through work analysis of key fleet type billets. Some of these studies are inservice and some are on contract. Psychology and, to a certain degree, psychiatry are used daily in the selection of personnel for special duties, as for example in the submarine service and in aviation.

CLINICAL INVESTIGATION IN NAVAL HOSPITALS

Medical research is not confined to the laboratories nor to specially trained scientists. Support for clinical investigation is now an established policy of the Navy, and encouragement in this direction is offered to regular personnel and reserves on temporary active duty, including the Medical and Dental Corps and the Allied Sciences Branch of the Medical Service Corps. Clinicians are invited to report interesting, well-studied cases; assemble data on groups of cases; evaluate methods of treatment; and study physiologic, chemical, and metabolic alterations in disease and injury. Research Division stands ready to analyze protocols and experimental designs so that advice is constantly and readily available to the younger investigators. The same sympathetic co-operation is provided by Publications Division, Professional Division, and other divisions and personnel of the Bureau.

The Metabolic Research Facility at Oakland Naval Hospital has contributed numerous studies of diseased states and has been active in the use of the artificial kidney. The Prosthetics Laboratory there continues its work on preparation of prostheses and rehabilitation of amputees, and plans a research program in these special fields. Certain hospitals have extensive programs of surgical research, as for example in Norfolk and St. Albans.

The Bureau now has plans for establishment of Clinical Investigation Centers in the larger naval hospitals. In order that these may be a source of pride to the Navy, as well as for certain administrative reasons, a military component is necessary, including one or more medical officers assigned full or part time to the center and such other naval personnel as are required. In view of current reductions in force and because special knowledge may be desirable, there will also be a civilian component of scientists, technicians, secretaries, et cetera. This combination will assure the Navy of productive research, valuable in discovering the cause, nature, mechanisms, and treatment of disease. The Navy will thus take its part in the over-all development of modern medicine and surgery.

DENTAL RESEARCH

Dental science and medicine have become more and more closely associated. Dental research is a large segment of the work of the Research Division and the Bio Sciences Division of the Office of Naval Research. It has been built to significant proportions by dedicated dental officers. The studies at the Naval Medical Research Institute and Naval Dental School are correlated with those undertaken in various dental field establishments in the Navy and with contracts negotiated by the Office

of Naval Research. The Navy takes justifiable pride in the results of investigations of dental caries, periodontal disease, influence of enzymes, relationship of oral conditions to health, and technical advances in treatment and prosthetics.

PREVENTIVE MEDICINE

Responsibilities of the Bureau and Medical Department in preventive medicine are far flung and research plays a significant part. Knowledge must be increased in relation to insect and rodent control, vectors of disease, etiology of communicable disease, immunization, and treatment. These apply to matters in the fleet and ashore. In addition, the Navy is one of the largest employers in industry. Thus, preventive medicine must investigate and test protection against trauma, visual disorders, toxic materials, et cetera. Its program of accident prevention depends in large measure on factors of cause, accident proneness, and other aspects of the problems.

BASIC RESEARCH

The discussion above relates to operational projects and programs. In science, however, there must be a backlog of fundamental research which cannot be allowed to decrease. In preparation of an experimental design for operational studies, gaps are sometimes discovered in knowledge of essential parts and of technics. Our investigators are often obliged to fill these gaps by what is called supporting research. In order to attract and hold investigators for immediate and future needs of the Service, a certain amount of truly basic research must be encouraged and permitted.

As C. C. Little has said, "All progress against disease and death traces back to basic pioneer research." This is the type of research which has broad theoretical importance. It is the seeking of knowledge for its own sake, and many of those who have contributed have not been activated by motives other than increasing knowledge without consideration of its application.

Abraham Flexner[2] in his article, "The Usefulness of Useless Knowledge," emphasizes the fact that basic research is pursued without thought as to application. Nevertheless, the whole background of our present knowledge of electricity evolved from basic research. The discovery of Herzian waves was without any forethought of the remarkable achievements in radio and radar. In my own experience, I have seen the observations of Whipple on regeneration of proteins and blood lead to the control of pernicious anemia and the basic work of Macleod on carbohydrate metabolism lead to the production of insulin. The work on fractionation of complement by Heidelberger, by Ecker, and others has been applied to the production of highly purified toxoids

and to that remarkable protein named properdin which is instrumental in natural immunity.

A few examples from Naval Medical Research Institute are in point. The use of radiogallium in relation to bone tumors was the outgrowth of basic studies on rare metals. The activities of the malarial parasite in mosquitoes were the subject of fundamental studies which in turn have led to a rapid method for assaying antimalarial drugs. The studies on crystal formation in freezing tissues have led to a new concept of the damage in frostbite, and give a clue to improved methods of preserving blood for transfusion. Promise of treatment of nerve gas poisoning and of irradiation injury has resulted from basic studies on acetylcholine and its esterase and on sulfhydryl groups. The development of the treponemal immobilization test rested on attempts to cultivate this organism. Examples could be multiplied.

OFFICE OF NAVAL RESEARCH

Without this unique organization, medical research in the Navy would suffer serious handicaps. A most important function is the support of basic research in universities, research institutions, and other nonprofit agencies. The Office covers the large field of naval research in its various divisions, but especially important to the Bureau of Medicine and Surgery is the Bio Sciences Division, with which the inservice research is closely allied. Through its many contacts information can often be provided to fill some of the gaps important to the solution of operational problems. It serves the Bureau in making contracts with extramural agencies for these purposes and for studies to be correlated with those in the Service. Research which it supports directly helps build up that backlog of basic knowledge essential to the program of biomedical research.

COORDINATION

Various mechanisms are established for coordination, liaison, and advice. The offices of the Assistant Secretaries of Defense for Research and Development and for Health and Medical affairs have contributed significantly. The Military Coordinating Committee of the Assistant Secretary for Research and Development meets regularly to coordinate the work of the three Services and to avoid needless duplication. The National Research Council is always available for advice through its committees and subcommittees. Of special importance in evaluation and guidance is the Committee on Naval Medical Research of the National Research Council. All members are Navy orientated and some have performed extensive duty in the Navy. Rear Admiral Richard A. Kern (MC) USNR is the Chairman. Rear Admiral Winchell McK. Craig (MC) USNR is a member, as are also Doctors Eugene F.

DuBois, Lee E. Farr, Maurice J. Hickey, Lawrence C. Kolb, Christian J. Lambertson, Joseph L. Lillienthal, Jr., Harry Most, Carl Pfaffmann, and Richard E. Shope. In addition, there are the Honorary Consultants to NAMRU-3 in Cairo, the American members being Doctors Lowell T. Coggeshall, Wallace Fenn, and Paul B. Beeson. The Armed Forces Epidemiological Board is constantly available for information, guidance, and aid. Coordination is aided by the Bio Sciences Information Exchange and Armed Services Technical Information Agency. Authorities in the Army Medical Service Graduate School and the National Institutes of Health, as well as in the numerous scientific activities in the Washington area, are generous in their aid. The London branch of the Office of Naval Research keeps us aware of research in Britain and Europe. Liaison officers in the British and Canadian Joint Services give us valuable aid.

PERSONNEL

Those who conduct research are in two main categories. Numerous clinicians conduct research in addition to care of patients, teaching, and administration. The second category includes those who devote much or all of their time and energy to investigation. With the first group it is in a sense an avocation; with the second it is a vocation, "a major social force." This latter group comprises those who recognize research as a way of life and have dedicated themselves to it. The number of clinicians is determined in large part by their own desires and time. The number in the second group is determined by assignment, which in its turn depends on the number of medical officers and others allocated by instructions from the Department of Defense. At this writing there are 67 medical officers, a reduction in the past 18 months of about 40 percent. In dental research there are 11 officers on full time. Seventy-one allied science Medical Service Corps officers give their whole time to research.

The esprit de corps of the Navy depends in considerable measure on having a firm corps of medical and dental personnel, made up of those who, by training, experience, and motive, are dedicated to research. This corps of uniformed personnel can be augmented but not substituted by civilian scientists. However, the research potential of the Navy is increased by civilian scientists and there is no reason why this should be changed. The ratio of uniformed and civilian scientists hinges on the number of the former allocated and the number of the latter allowed by civilian ceilings. It varies naturally with the kind of laboratory or other activity.

Medical research in the Navy is still in its youth; it was begun in a major way in 1942 and has grown steadily since that time. The man who initiated a broad interest in research was Rear

Admiral Harold Wellington Smith (MC) USN, and his devotion to it was manifest long after his retirement. In an address before the Surgeon General's Conference, 16 April 1945, he said, "Research is the child in whose hands the future lies." The fruit of his vision is seen in the research activities of the Medical Department, in spite of limitation of personnel and funds. The number of research reports is hardly an indication of the quality of the work, but we can be proud of the fact that, in 1954, 342 reports were received in the Bureau, some classified and some reproduced for publication in scientific literature.

SUMMARY

Medical research in the Navy is essential to the "combat readiness" of the service. It is pursued in various research laboratories under either management or technical control of the Bureau of Medicine and Surgery, situated in the United States and overseas, and in naval hospitals. It applies to our personnel afloat and ashore. The disciplines of biology are used as tools in the solution of problems undertaken in research laboratories or naval hospitals. Engaged are uniformed and civilian personnel at different levels of rank, including regulars and those on temporary active duty. The studies may be operational, supporting, or basic, as guided by the needs of the Service. In addition, contributions are made in dental science and preventive medicine. Coordination is assured by bodies in the Department of Defense, notably the Office of Naval Research, and by quasi-governmental and civilian agencies. With full recognition of the significant contributions of civilian scientists, the maintenance of a strong corps of investigators in uniform is of the utmost importance to the overall esprit de corps and morale of the Naval Medical Department.

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BEN FRANKLIN ON FREEDOM OF THE PRESS

It is likewise as unreasonable what some assert, *That Printers ought not to print any Thing but what they approve;* since if all of that Business should make such a Resolution, and abide by it, an End would thereby be put to Free Writing, and the World would afterwards have nothing to read but what happen'd to be the Opinions of Printers.

—BENJAMIN FRANKLIN

EXPERIENCES IN CARDIOVASCULAR SURGERY

I. Patent Ductus Arteriosus; Coarctation of Aorta

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SOME OF THE most outstanding advances in cardiac surgery, made during the past several decades, are still new in the memories of most of us. Listed in the historic order in which they became amenable to surgical correction are four conditions —patent ductus arteriosus, coarctation of the aorta, mitral stenosis, and atrial septal defect. In addition, effective therapy for the most dread complication of these conditions, subacute bacterial endocarditis, is a relatively recent development. These innovations have made the care and management of patients with heart disease a more rewarding experience. A continuing challenge remains, however, in the realization that patent ductus, coarctation, mitral stenosis, and atrial septal defect cause only about four percent of the deaths from heart disease in the United States. The ability of Lillehei[1] at the University of Minnesota to unhurriedly close ventricular septal defects under direct vision is an exciting development indicating new horizons ahead.

Our experience in the surgical correction of these conditions is discussed herein in detail; experiences with other operable cardiac lesions are summarized. The diagnosis and management of these patients at this hospital have been accomplished through the co-operative endeavor, not only of the medical, surgical, and radiologic services, but of such other hospital services as anesthesiology, pediatrics, and nursing as well.

A. PATENT DUCTUS ARTERIOSUS

Patent ductus arteriosus is the third most common form of congenital heart disease, exceeded in frequency only by atrial

From Brooke Army Hospital, Fort Sam Houston, Tex. Presented as a symposium at the monthly staff meeting on 9 November 1954.

and ventricular septal defects. It is twice as common in females as in males. When the ductus fails to close at birth a shunt of blood from the high pressure systemic circulation to the lower pressure pulmonary circulation usually results. This shunt may reach huge proportions so that as much as 75 percent of the left ventricular output is forced back into the pulmonary circulation. Cyanosis is not present except when pulmonary hypertension develops with reversal of blood flow through the shunt, and is then often confined to the lower half of the body. Characteristic features are the continuous machinerylike murmur with a thrill in the left infraclavicular area, increased pulse pressure with a collapsing pulse, enlarged heart, and increased pulmonary vascularity. Ninety-five percent of patients have the continuous murmur, but in the presence of pulmonary hypertension only a systolic murmur may be heard and the diagnosis must be established by cardiac catheterization or other diagnostic means.

This lesion is a definite threat to life. The average life expectancy without surgical intervention is between 25 and 35 years. The usual cause of death is subacute bacterial endocarditis or congestive heart failure. Because of the hazard to life from a patent ductus and the low operative mortality, surgical closure is recommended for all patients with uncomplicated lesions. Operation is usually deferred, however, if a child's circulation is not seriously embarrassed, until he is about four years of age because of the increased incidence of pulmonary complications due to thoracic operation in infancy.

ROENTGENOGRAPHIC FINDINGS

In this condition, the most prominent roentgenographic feature is enlargement of the pulmonary artery and left ventricle (fig. 1). The enlargement of the pulmonary artery is seen not only proximal to its bifurcation but also in the main branches and out into the lung periphery. This dilatation is caused by the increased blood flow and by hypertension of the lesser circulation. The latter may eventually result in hypertrophy and enlargement of the right ventricle with resulting rotation of the heart and elevation of the apex (fig. 2).

The arch of the aorta tends to be normal to large in size and shows vigorous expansile pulsation on fluoroscopic examination.

Margulis and others[2] pointed out that calcification at the aortic end of the ductus is rarely seen, but when demonstrated is diagnostic of the condition. This calcification is ringlike and is in the wall of the aorta.

Goetz[3] was the first to point out that a defect in the pulmonary artery filled with opaque material could be caused by regurgitation of nonopaque blood through the patent ductus. This is

referred to as the "jet sign" and is a highly reliable diagnostic sign when found. It cannot be demonstrated without fairly high-speed angio-cardiographic technic. This may be reversed by forceful injection of opaque media into the pulmonary artery, causing elevation of the pressure to the extent that the dye will enter the aorta. We have yet to demonstrate successfully either of these highly diagnostic roentgen signs.

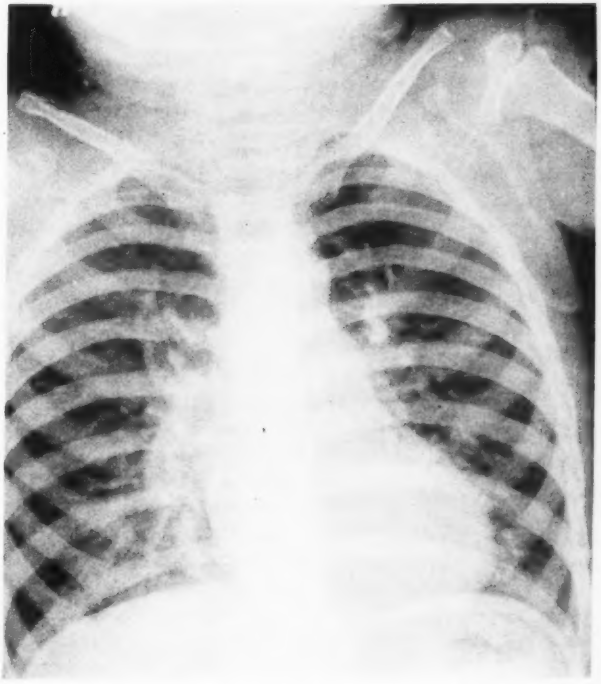

Figure 1. Roentgenogram of a patient with patent ductus arteriosus showing enlargement of the left ventricle and pulmonary artery. In addition, there is prominence of the aorta and pulmonary vascular markings.

SURGICAL CONSIDERATIONS

Matters of surgical technic usually are sufficiently elementary so that little discussion of them is needed, but in a relatively new field procedure is more important. For operations on the patent ductus, we place the patient either in the lateral or anterolateral position with left side up. Either position is suitable but many prefer the lateral position for adults and the anterolateral approach for children. Whether the chest is entered through the bed of a resected rib or through an intercostal space is strictly

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a matter of individual choice, each having its proponents; we use either method. Exposure of the ductus, including its posterior aspect, is entirely by sharp dissection under direct vision.

The question of whether to ligate or divide the ductus has been a matter of some controversy. Obviously, it is simpler and quicker to ligate but the decision must be based on end results

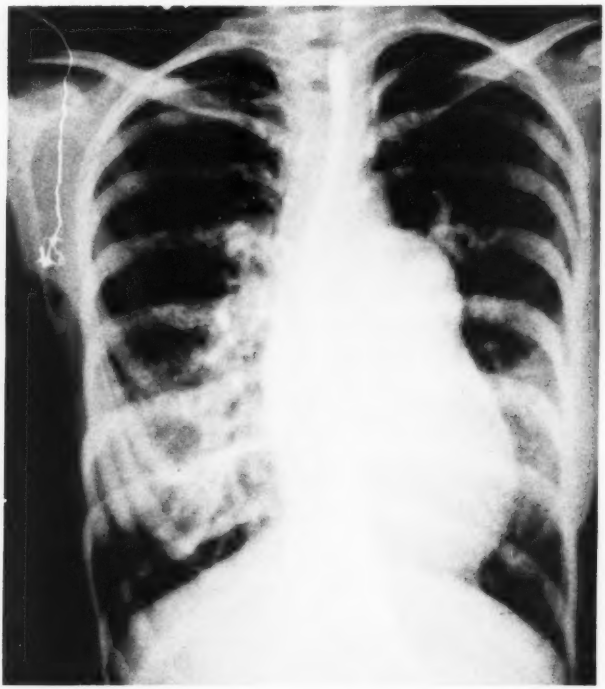

Figure 2. Roentgenogram of patient with patent ductus arteriosus with marked pulmonary hypertension. Cardiac contour is characteristic of right ventricular enlargement with a huge pulmonary artery. The absence of right atrial enlargement distinguishes it from atrial septal defect.

rather than on expediency. If ligation is done, a ligature at each end of the ductus should include the adventitia of the aorta and pulmonary artery to prevent the force of blood from pushing the ligatures toward the center of the ductus, leaving a nipple of lumen on each end. This causes return of the murmur even if the shunt is not re-established, and probably favors development of vegetations, which the operation was to obviate. If ligation is used, a third central transfixing tie should be used to still further hinder recanalization.

Complete division of the ductus seems more definitive and is recommended. The Pott's ductus clamps with angled handle are used and we have not found it necessary to use more than one clamp on each end. We obtain length of ductus by pushing the clamps well into the wall of the aorta and pulmonary arteries. In case a very large short ductus is found and sufficient length cannot be attained, dissection around the aorta will allow placement of one of several types of clamps which include part of the aortic wall without shutting off the lumen. The ductus then can be divided while a simple clamp is on the pulmonary artery end. The ductus is divided with a long knife, leaving more cuff on the aortic side. Closure by No. 00000 silk sutures may be by simple over-and-over stitch in one layer; by over-and-over stitch in two layers, the second layer being reversed so that the stitches cross; or by a double layer, the deep one as a continuous mattress and the superficial one over-and-over. The side to be closed first is a matter of individual choice. Because of lower pressure, the pulmonary side rarely gives trouble and it is well to get this clamp out of the way first.

When closure is completed and the clamps are removed, a small gauze square is packed over the suture lines, oozing blood is ignored, and the lung is re-expanded. It requires about five minutes for the sutures to reseat themselves in adjustment to arterial pressure, at which time the suture lines are inspected. Oozing of blood usually will have stopped. Only a spurting area indicates need for an additional suture and, even here, time may cause hemostasis to become complete. Several types of accidents may eventuate. The least alarming is damage to the recurrent laryngeal nerve. This complication can be avoided by care, by sharp dissection, and by maintaining a dry field. Sometimes the pulmonary end of the ductus will slip back into the pericardium. Rapid opening of the pericardium, pressure control of bleeding, and application of a clamp constitute the preferred method of procedure. This seemingly simple procedure may require several hours of operating time. Tearing of the ductus or excessive leakage at the aortic end is more serious because of the greater pressure and more rapid bleeding. Cross clamping of the aorta long enough to reapply a clamp to the ductus or stump is an acceptable procedure. Some operators place an umbilical tape around the aorta, primarily so this can be used in an emergency to control the aorta. In general, division and suture of the patent ductus is not a difficult procedure, provided the operator is technically competent and performs each successive step correctly and well.

RESULTS

Since 1950, 31 patients have been operated on for a patent ductus at this hospital. Three were operated on in 1950, five in

1951, six in 1952, seven in 1953, and 12 in 1954. The average age of the patients operated on was 15.5 years, the youngest being three years of age and the oldest 35. The operative procedure consisted of ligation or division of the ductus; 17 were ligated and 14 were divided. In 1954 all were divided.

Of the immediate complications, one was intrapleural bleeding which necessitated re-exploration of the chest. This bleeding was found to be from a small apical adhesion and not related to the division of the ductus. One patient in whom ligation of the ductus was performed had a reoccurrence of her murmur about one week following the operative procedure, but she was symptomatically improved. One patient, following ligation of the ductus, was found to have a paralysis of the left diaphragm, and another in whom the ductus had been divided had paralysis of the left vocal cord which persisted for two months.

Coexisting anomalies which we have found at the time of exploration for patent ductus are: An aortic pulmonic window and a patent ductus; a pulmonary stenosis and a patent ductus; and an aneurysm of the left circumflex coronary artery with a patent ductus. The patients with the first two mentioned conditions died, the first within 24 hours from cardiac failure and the second three months after operation. These two patients were not included in the previous series because patent ductus was not their primary disease, although they were included in our total mortality figures. The third patient had no treatment for the aneurysm of the coronary artery and is doing well.

The one late complication was a recurrent murmur. At re-exploration five months after the initial operation, the ductus was divided but no definite lumen was identified. There was no mention in the postoperative follow-up as to whether the murmur had disappeared.

The mortality rate from either ligation or division of the patent ductus has been zero in this series of 31 patients.

T-WAVE CHANGES IN PATENT DUCTUS ARTERIOSUS

Investigators at the Institute of Cardiology in Mexico City[4] and elsewhere[5] have written of the electrocardiographic changes in patients with patent ductus arteriosus. The characteristic changes described consist of high, symmetrically peaked T waves. This is thought to result from diastolic overloading of the left ventricle and occurs in other conditions associated with diastolic overloading of this ventricle. The electrocardiogram in patients with patent ductus is usually read as "normal" or "left ventricular hypertrophy." The high, peaked T waves do not constitute an abnormality in the usual reading of electrocardiograms.

The electrocardiograms of patients with proved cases of patent ductus arteriosus at this hospital have been reviewed. Both preoperative and postoperative electrocardiograms are available for study from 23 of the 31 patients. Of these 23, electrocardiograms of 18 were read as "normal" and of five as "abnormal." Of the five abnormal readings, four were "left ventricular hypertrophy" and one was "combined ventricular hypertrophy." The characteristic T-wave changes were noticeable in the electrocardiograms of 19 patients, or 82 percent of those considered. This peaking and increased amplitude of the T waves were not uniform in all electrocardiograms, because they varied in degree from patient to

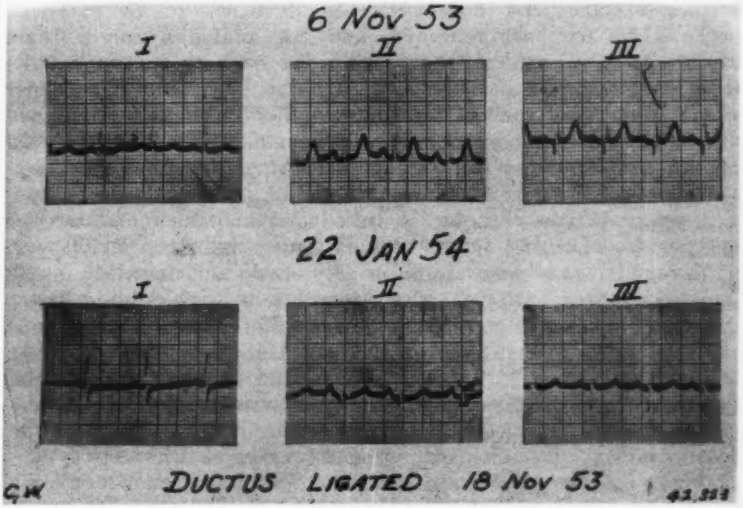

Figure 3. Pre- and post-operative electrocardiograms of patient with patent ductus arteriosus. The high peaked T waves in leads II and III are decreased in amplitude following ligation of the ductus.

patient. These findings were seen best in different leads in the electrocardiograms of different patients, and there was no apparent uniformity as to which lead of the electrocardiogram might demonstrate them best. Four patients, or 17 percent, did not have the characteristic T-wave findings. These four were women in their early twenties; all had normal electrocardiograms and few or no symptoms preoperatively.

When the postoperative electrocardiograms were compared with the preoperative tracings the following were noted: (1) The peaking and increased amplitude of the T waves reverted toward normal in all cases; (2) left ventricular hypertrophy reverted toward normal in all cases; and (3) the electrocardiogram of the one

patient with combined ventricular hypertrophy reverted toward normal following obliteration of the ductus.

If looked for, the characteristic T-wave changes of diastolic overloading of the left ventricle may be seen in a large percentage of patients with patent ductus arteriosus. These T-wave changes revert toward normal following obliteration of the ductus (fig. 3).

POSTOPERATIVE CARDIAC CATHETERIZATION

In 1929, Forssmann[6] performed on himself the first human cardiac catheterization, using a ureteral catheter passed through an arm vein exposed by a surgeon. Since that time the procedure has become standardized and, with the development of improved methods for pressure recording and gas analysis, increasingly useful. At this hospital, the technic has been to expose a suitable arm or leg vein, under local anesthesia in adults or under rectal pentothal (brand of thiopental sodium) analgesia combined with local infiltration in children. The usual vein has been the median basilic in the left antecubital space; the greater saphenous vein has proved particularly useful in small children. A special ureteral type catheter is introduced and advanced through the peripheral veins into the vena cava, the right atrium, the right ventricle, and into the pulmonary artery and distal divisions of the pulmonary arteries. Occasionally, it is possible to pass the tip of the catheter through a septal defect or into an anomalous pulmonary vein. Continuous electrocardiographic monitoring is used and the catheter is advanced under fluoroscopic observation. Recording facilities allow pressure recordings and oximeter analysis of oxygen saturation when desired. The oximeter determinations are checked by gas analysis. The safety and morbidity of the procedure seem comparable to endoscopy and other well-established diagnostic instrumentations.

Cardiac catheterization is a procedure requiring the co-operative efforts of members of the departments of anesthesia, radiology, surgery, medicine, and the laboratory.

Preoperative cardiac catheterization is used in the study of cardiac problems when it is thought probable that useful diagnostic information will be obtained. The benefits to the patient when a surgically correctible lesion is proved are obvious. Catheterization following cardiac operations is less often of immediate benefit to the individual patient. It is usually done to obtain information which will advance medical knowledge, aid in the evaluation of surgical technics, or elucidate the physiology of the operated lesion, or to determine the reversibility of pathologic changes. Because of these considerations and because many of our operative cardiac patients do not reside permanently in this area the number of patients we have studied following operation is small.

To date we have had occasion to study only one patient following a corrective operation for patent ductus arteriosus. The pertinent catheterization findings are summarized in table 1. These findings demonstrate reduction of pulmonary hypertension following closure of an unusually large patent ductus.

TABLE 1. *Pre- and post-operative cardiac catheterization findings in patient with patent ductus arteriosus*

Findings	Preoperative	Four months postoperative
Right ventricular pressure	100/7 mm. Hg	48/2 mm. Hg
Pulmonary arterial pressure	90/54 mm. Hg	48/15 mm. Hg
Shunt	8 L/min	none
0_2 Pulmonary artery	87 percent saturation	66 percent saturation
0_2 vena cava	68 percent saturation	67 percent saturation

B. COARCTATION OF THE AORTA

Coarctation of the aorta is from three to four times more common in men than in women. It is thought to develop in utero. The usual point of constriction of the aorta is just distal to the insertion of the ductus arteriosus. As a result of this constriction there is a stimulus to collateral circulation in utero. If the fetus survives there is little additional circulatory burden at birth and most do well for some time thereafter. If on the other hand the constriction of the aorta is proximal to the insertion of the ductus arteriosus, there is no stimulus to the development of collateral circulation during intra-uterine life because at that time the lower part of the body gets its blood supply largely from the pulmonary artery through the ductus. Under such circumstances, if the ductus closes at birth, an overwhelming load is suddenly thrown on the circulation and death often ensues from congestive heart failure before collateral circulation can develop.

Coarctation definitely shortens life; the average life span is about 30 years, and only one in 10 survives beyond 50 years. As a result of impediment of blood flow there is usually hypertension in the upper part of the body that is more marked following exercise; hence, the resting blood pressures may give a false sense of security. The usual causes of death in patients with coarctation are rupture of the aorta in 25 percent; subacute bacterial endocarditis, often on an associated bicuspid aortic valve, in 20 percent; congestive failure in 20 percent; and rupture of berry aneurysms of the circle of Willis in 10 percent. Coarctation should be ruled out as a contributing cause of spontaneous subarachnoid hemorrhage in a young person.

The diagnosis of coarctation is aided by carefully palpating the femoral arteries as a part of every physical examination and by comparing the blood pressure in the arms and legs if there is a suspicion that the femoral pulses are diminished. The ideal time to operate on these patients is between the ages of eight and 18 years so that they will not be needlessly exposed too long to the many potentially fatal complications.

The responsibility for the timely diagnosis of coarctation, hence, rests heavily on the pediatrician. Statistically, one in every 2,000 to 3,000 children have coarctation.

ROENTGENOGRAPHIC FINDINGS

The roentgenogram aids in determining the diagnosis and demonstrating the site and extent of the lesion. Frequently, coarctation is suspected from the study of routine roentgenograms of the chest.

Rib notching was the first recognized roentgenologic sign of this lesion and remains the most important one. Other causes for rib defects have been cited but are extremely rare and are of little clinical significance. Reliable indications of diagnostic rib changes are observed in about 70 percent of patients with proved lesions. The fourth to the eighth ribs are commonly involved; less frequently, changes may be seen above and below this level. Notching becomes more prominent as the patient grows older. This phenomenon is rarely seen below the age of 10, but has been reported at a much younger age. Unilateral changes may be seen when the left subclavian artery is in the site of the coarctation. Figley[7] recently called attention to changes in the contour of the barium-filled esophagus associated with coarctation, particularly the displacement caused by the poststenotic dilated segment. Poststenotic changes may be demonstrated in a high percentage of patients by introducing barium into the esophagus and making roentgenograms in the oblique and lateral positions.

The "figure 3" sign is helpful when present, particularly if rib notching is not prominent. The upper arc of the "3" is due to prominence of the left subclavian, while the actual site of the coarctation is represented by the center portion of the "3." The lower arc, which is usually not as acute as the upper one, represents the poststenotic part of the descending aorta (fig. 4).

Absence of the aortic knob is the least reliable sign of this lesion. About 50 percent of the patients will have an aortic shadow that cannot be differentiated from the normal. The site and extent of the lesion is best demonstrated by angiocardiography (fig. 5) or aortography.

SURGICAL CONSIDERATIONS

In the surgical correction of coarctation of the aorta, a lateral position with wide exposure is desirable, sharp dissection is advisable, and a dry field is a necessity. As the coarcted area is freed of overlying pleura, the ductus area is exposed and the ductus or ligamentum is ligated and divided. This should

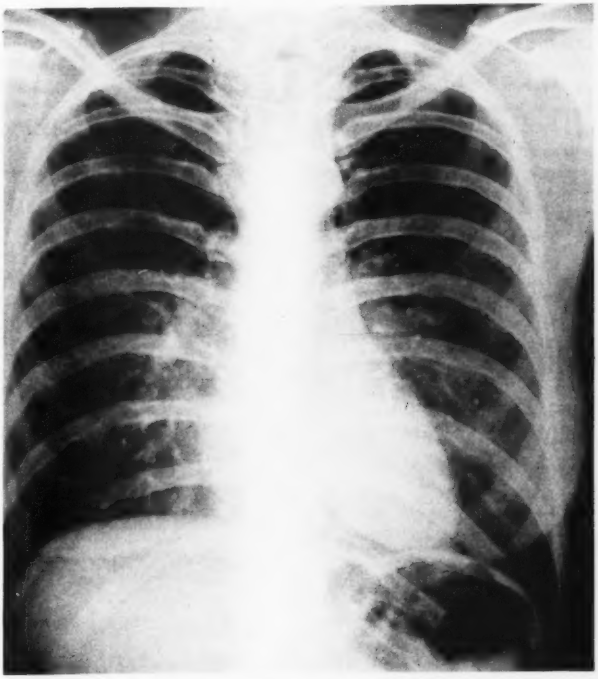

Figure 4. Roentgenogram demonstrating rib notching and the "figure 3" sign in patient with a proved coarctation of the aorta.

be done carefully because often there is a residual lumen. As dissection progresses, one must manage the dilated intercostal vessels. Only those that interfere with the anastomosis should be divided. Others should be temporarily clamped if the cross clamps on the aorta are unlikely to control them. Usually, by angiography preoperatively, it will be known whether or not there is a long defect which will require a graft. Some operators have turned down the subclavian artery to anastomose it with the distal segment. This is satisfactory if kinking is prevented. A better procedure is end-to-end anastomosis of the aorta after excision of the coarcted segment. Here again, suture technic is largely

a matter of individual preference. In our patients an over-and-over stitch or a continuous mattress suture has been used. Experimental work has shown the end results to be identical. For cross clamping, simple coarctation clamps are used. In most of our patients, the lumen was tiny so that cross clamping was not dangerous, and we have had no complications. In the absence of good collateral circulation, however, speed is essential and

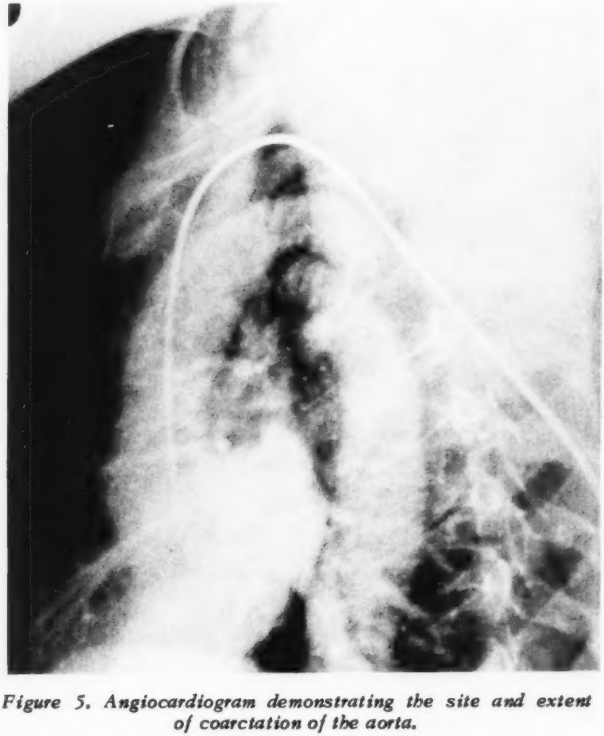

Figure 5. Angiocardiogram demonstrating the site and extent of coarctation of the aorta.

refrigeration should be employed or some by-pass procedure used. In case a graft is needed, it should not be too long for the defect because the force of the blood flow will tend to buckle and obstruct the graft. The graft should be placed with its ligated intercostals uppermost, so that if bleeding from them occurs they will be accessible. We have not used nylon cloth grafts in patients but have done a successful series in animals. We have used lyophilized and fresh preserved vessels with equal success.

RESULTS

Since June 1953, 11 patients with coarctation of the aorta have been operated on at this hospital; all are living. Ten patients had

their coarctation resected. In one patient who lacked significant collateral circulation, operative removal of the constricted area was considered a greater risk than his disease and resection was not done.

Seven patients were males, four females. They ranged from a boy of eight years to a woman of 45 years who had been told six years previously that she was too old to risk surgical intervention.

Of the 10 patients who had surgical correction, three required grafts which were homologous aortic grafts. In the seven patients having primary anastomosis, defects up to 2.5 cm. in length were overcome successfully.

The lumina of coarctations varied from complete obliteration to 5 mm. in diameter. Angiocardiography in the one patient with minimal disease showed little collateral circulation, and we must assume that minimal constriction existed. Another patient by angiocardiography showed little collateral circulation. This patient was refrigerated in an ice bath and the rectal temperature lowered to 82.4° F. With lowered metabolism, the spinal cord was able to withstand the oxygen deprivation during the period of circulatory occlusion while a graft was inserted, and the patient made a complete recovery.

Complications have been few. One patient bled from an intercostal artery while still on the operating table. Thoracotomy and ligation of the vessel was done with dispatch and success. The second complication was in a 39-year-old woman who on the twelfth postoperative day suddenly developed shock. On conservative therapy she made an uneventful recovery. Bleeding, either from an intercostal artery or from the anastomosis itself, apparently had occurred.

Our follow-up period is short. All patients in the immediate postoperative period showed improved pulses and elevation of blood pressure in the lower extremities with a decrease in blood pressure of the upper extremities. All patients became normotensive except one whose blood pressure was reduced to some extent. One patient continued to have an aortic diastolic murmur, presumably due to a bicuspid aortic valve.

The outlook, in all fairness, is not completely optimistic. One wonders if cerebral aneurysms are the result of hypertension or are associated congenital anomalies. Valvular abnormalities, especially the bicuspid aortic valves present in a large number of patients with coarctation of the aorta, predispose to subacute bacterial endocarditis and are not correctible by operative means. Nevertheless, surgical intervention is the only form of definitive therapy available and is proving successful.

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(To be concluded)

DEMOCRACY IN PSYCHIATRIC HOSPITALS

Perhaps the democratic way of dealing with mental patients as equals of each other is the best in the long run; it certainly is the smoothest and most efficient way of dealing with the patient in his own best interests. I am reminded of an experience during the recent war when as a newly activated medical officer I was faced with admission to the ward of a suicidal major general. One of my assistants, a lieutenant, called our commanding officer, a Regular Army colonel, to ask him if there were any special things we were to do in the circumstances. The colonel curtly replied: "Take off his uniform and you will outrank him." This was promptly done and the patient made an uneventful recovery under the right form of treatment in a ward which contained all ranks and which provided the best treatment facilities that the Army can provide.

—LEO ALEXANDER, M. D.
in *American Journal of Psychiatry,*
p. 106, Aug. 1954

SOME RULES OF THUMB IN ESTIMATING RADIOLOGIC HAZARDS

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IN THE absence of proper detecting instruments, some rules of thumb may aid in the rapid estimation of radiologic hazards produced by radioactive contamination from an atomic detonation.

To evaluate the reports of monitors surveying a station in terms of existing radiologic hazards to personnel, the officer-in-charge must know the maximum radiation dosage allowed for any person as established by the Command; the dosage personnel have already received; the effects of varying amounts of radiation on personnel; the existing dose rate of radiation in the area; and a ready, simple method for accurately and rapidly estimating the radiologic situation.

With this information, and in accordance with the Command's maximum radiation exposure-dosage allowance for personnel, the officer-in-charge can quickly determine whether to permit personnel to remain in the area; the period of time personnel may continue working in the area; the time when personnel should leave the area; whether personnel may safely enter another area; and how operations in a radiologically contaminated area might be continued by the proper rotation of personnel.

The knowledge of certain radiologic rules of thumb and their applicability will, in the absence of graphs and tables, enable one to decide successfully on a course of action.

During the period immediately after an atomic detonation, *i. e.*, from eight to 12 hours after explosion, the medical officer will have most serious responsibilities. He should be able to determine quickly whether his sick bay is a safe haven for his casualties. If it is radiologically contaminated he must be able to ascertain quickly the time period in which his patients must be removed, and to determine the maximum time his assistants can be exposed to radiation so that their exposure during the execution of a necessary mission will be minimal. It becomes self-evident, therefore, that any rules that will aid him in his decisions will probably save lives, conserve manpower, allay panic, and make

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the discharge of his responsibilities much easier. The following "rules" are most suitable if applied during the 12 hours immediately following the atomic explosion.

The concept of "thumb rules" for evaluating radiation hazards is not original; a splendid manual[1] has already introduced such rules. The rules presented in this article, however, are modifications of the earlier rules and more closely approximate the "true" estimate; they incorporate into the system two "new" practical rules, and state these principles in a form which may permit easier retention.

THE "2-4-6" RULE

When readings are announced by a monitor it is obvious that their significance must be understood in terms of probable sickness and/or death. It is admitted that susceptibility to radiation varies among individuals. Statistical data[2] which express the probability of sickness and/or death from radiation are available. The data on which probabilities are based are accepted as valid even as much as actuary statistics, *i. e.*, the laws of probability and chance.

The most important nuclear radiation hazard to personnel from an atomic detonation is gamma radiation. By definition, an *acute* dosage of gamma radiation is that amount of gamma received by a person *over the entire body within a 24-hour period.*

Table 1 lists the probable effects on personnel of varying amounts of acute gamma dosage.[2] Nausea and vomiting developing within 24 hours after radiation exposure are among the earlier indications that a person has received a significant amount of gamma radiation. However, it must be kept in mind that, under conditions of stress, nausea and vomiting might be of psychogenic origin.

In personnel who have received 600 r or more gamma radiation, vomiting will probably develop within the first four hours after exposure.

Table 1 deals with dosage and not dose rate. Dosage refers to the *amount* of roentgen whereas dose rate refers to *rate* of roentgen. This distinction is akin to that between the mileage indicator of an automobile (revealing the number of miles traveled, *i. e.*, dosage), and the speedometer (indicating miles per hour, *i. e.*, dose rate).

The "2-4-6" rule merely reminds one that an acute dosage of

200 r results in 50 percent of personnel sick with no deaths
400 r results in 100 percent of personnel sick with 50 percent deaths
600 r results in 100 percent of personnel sick with 100 percent deaths*

*Biologic variation will ensure a few survivors.

TABLE 1.* *Probable effects of varying amounts of acute gamma dosage on personnel*

Acute dosage (r units)	Effect on exposed personnel		Comment
	Sick (percent)	Die (percent)	
50	0	0	No sign of sickness. No decrease in combat effectiveness.
100	2	0	Nausea and vomiting in two percent for about one day. All able to perform duty.
150	25	0	Nausea and vomiting in 25 percent for about one day. No need for personnel evacuation expected.
200	50	0	*One half are sick.* Nausea and vomiting in 50 percent for about one day. All evacuated as soon as possible. No deaths expected.
300	100	25	Nausea and vomiting in all on first day. All evacuated as soon as possible. Survivors ineffective for full military duty for about three months.
450	100	50	*All sick, one half die.* Nausea and vomiting in all on first day. Survivors ineffective for full military duty for about six months..
650	100	100	*All sick, all die.*** Nausea and vomiting in all within four hours. Survivors ineffective for full military duty for over six months.

*Data taken with some modification from table 7.40, p. 104, of reference 2.
**Biologic variation will ensure a few survivors.

"TWICE THE TIME IS ONE HALF THE DOSE RATE WHICH IS 10 PERCENT TOO HIGH"

Radiologic defense bills provide for monitors, who after an atomic explosion survey areas to find existing dose rates. Because the number of monitors and radiac instruments are few, because the entire territory requiring monitoring is extensive, and because there are always unforeseen circumstances incident to combat conditions which delay the frequency of monitoring these areas, it is highly probable that within eight hours or so after an atomic detonation many essential compartments will have been monitored only once. Furthermore, it is likely that the first eight hours or so after an atomic burst will be the period during which officers-in-charge will be required to make their most critical decisions. Hence, any means by which dose rates for various

times after detonation can be computed is highly desirable and valuable.

H . . . . . A . . . . . B

H is the moment of burst
A is a specified time after H
B is a specified time after A
Time period HA equals time period AB

The rule of "twice the time is one half the dose rate which is 10 percent too high" states that when time period HA equals AB, the estimated dose rate at moment B is one half the dose rate reading taken at moment A, *but* this estimated dose rate for moment B is in error by 10 percent, *i. e.*, 10 percent too high.

Example. At one hour after atomic burst the dose rate is 1,000 r/hr.

1. What is the estimated dose rate at two hours after burst?

2. What is the dose rate at four hours after burst?

Solution. "Twice the time is one half the dose rate which is 10 percent too high" is the rule.

1. At two hours after detonation the dose rate is one half of 1,000, or 500 r/hr, *but* this is 10 percent too high. Correcting 500 by 10 percent gives 450 r/hr as the estimated dose rate at two hours after burst.

2. If the dose rate is 450 r/hr two hours after burst, at four hours after burst the dose rate will be one half of 450, or 225 r/hr, *but* this is in error at +10 percent. Therefore, the dose rate at the end of four hours will be about 200 r/hr.

"TWICE THE TIME WHICH IS 10 PERCENT TOO HIGH IS ONE HALF THE DOSE RATE"

The half life of a radioactive material is defined as the period of time in which its dose rate decreases to one half its original value. This definition is found in numerous texts and is well known to students of chemistry and physics.

	1,000 r/hr	500 r/hr	250 r/hr	125 r/hr
Burst	A	B	C	D
	1 hr			
	———	1.8 hr		
		———	3.24 hr	
			———	5.84 hr
				———

A is the instant one hour after atomic burst, the dose rate being 1,000 r/hr
B is a specified time after A when the dose rate is 500 r/hr
C is a specified time after B when the dose rate is 250 r/hr
D is a specified time after C when the dose rate is 125 r/hr

Thus, the period of time represented by AB is a half life, *i. e.*, the period of time in which the dose rate dropped from 1,000 r/hr to 500 r/hr. The period of time BC is another half life, *i. e.*, the time in which the dose rate dropped from 500 r/hr to 250 r/hr. Similarly, still another half life is represented by the time interval CD, *i. e.*, the time in which the dose rate dropped from 250 r/hr to 125 r/hr. Hence, the entire period of time from A to D is three "half lives."

An interesting and useful relationship exists between the time periods BC and AB as well as between CD and BC. This relationship is a ratio in which time period BC is about four fifths of time period AB, and CD is four fifths of BC. This means time periods can be related to moments when the dose rate decreases by one half, a useful bit of information.

This relationship is also expressed in the so-called four-fifths rule which states that the half life of gamma radiation from an atomic bomb fission product is equal to four fifths of the elapsed time since detonation.

Using a factor of four fifths in mental computation might easily lead to error, whereas making mental corrections of 10 percent is relatively easier. The rule, "twice the time which is 10 percent too high is the time when the dose rate will have dropped by one half," is another form of expressing the "four-fifths" rule, "twice the time which is 10 percent too high" always representing the moment when a half-life period is completed.

Example. At one hour after atomic burst the dose rate is 1,000 r/hr.

1. What time after explosion will the dose rate be 500 r/hr?

2. What time after explosion will the dose rate be 250 r/hr?

Solution. "Twice the time which is 10 percent too high is one half the dose rate" is the rule.

1. At one hour after explosion the dose rate is 1,000 r/hr, therefore at twice that time, *i. e.*, two hours after explosion, the dose rate is 500 r/hr, *but* two hours is 10 percent too high. Hence, correcting two hours by 10 percent gives 1.8 hours after explosion as the time when the dose rate will be 500 r/hr. In other words, 1.8 hours represent the completion of the half life.

2. At 1.8 hours after explosion the dose rate is 500 r/hr. Hence, 1.8 times 2 ("twice the time") which is 3.6 *but* 10 percent too high means that at 3.24 hours after detonation the dose rate will be 250 r/hr.

In the answer (3.24 hours), it is only necessary to carry out the result to one decimal place for all practical purposes because .04 of 60 minutes is only 2.4 minutes. Eliminating the second decimal place makes

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for ease in mental computations without significantly altering the results for practical purposes.

"THE DOSE RATE IS THE DOSAGE FOR THE FOLLOWING HOUR"

The rule states that the dose rate at a given amount represents the total dose of radiation (*i. e.*, dosage that will be received) in the hour following that given moment.

The rule is only an approximation since it neglects the decay of radioactive material during the one-hour period. A more exact method would allow for decay which calls for decay curves or tables of computed data. Although the values obtained by this rule are slightly high, this is a desirable feature because it includes a "safety factor" in the estimate.

It must be cautioned, however, that this rule can be used at any time *after* one-half hour following the burst. During the first half hour immediately following the burst, calculations by the use of this rule or any other method are of questionable accuracy due to the changing conditions in the deposit of contamination. It is in this first half hour following atomic detonation that full reliance must be placed on dosimeters and radiac instruments.

Example. The Command states that no man should receive radiation in excess of 50 roentgens. An emergency task which will take one hour must be performed. The dose rate in the area is 40 r/hr. May the men enter the area and work there one hour without exceeding the Command's 50-r maximum exposure limit?

Solution. "The dose rate is the dosage for the following hour" is the rule.

If the dose rate at the beginning of the hour is 40 r/hr and if the personnel entered at that moment and stayed for an hour they would receive a total dose of no more than 40 roentgens. Hence, the answer is "Yes."

"FIT FOREVER" RULE

The rule states that the "maximum radiation dose that can be received from a given moment to infinity is 5 IT."

"F" represents the factor 5 of the formula
"I" is the dose rate in roentgens per hour at a time ("T") after the explosion
"T" is the total time since the explosion

Example. The dose rate for an area is recorded as 10 r/hr at a moment six hours after atomic detonation. What is the total dose in roentgens that can be received if men entering that area at the moment of recording stay there until "infinity"?

Solution. "FIT forever" is the rule.

"F" is 5, "I" is 10 r/hr, and "T" is six hours. Hence, 5 times 10 times 6 equals 300 roentgens, the total dose that these men would receive if they stayed in the area "forever."

"FIT FOR HALF LIFE" RULE

This rule states that: "The total dose in roentgens received during one, two, three, four, or five half-life periods equals 1/10, 2/10, 3/10, 4/10, or 5/10 of 5 IT (*i. e.*, "FIT forever" rule).

Example. The dose rate in an area two hours after atomic burst is found to be 20 r/hr. What dose in roentgens will men receive if they enter that area at the time of reading and stay 1.6 hours?

Solution. The half life of a radioactive substance as previously stated is the period of time in which its dose rate decreases to one half its value. Because the dose rate at 2 hours after burst was 20 r/hr, the moment when the dose rate decreased to one half of this value, end of half life (as found by the "twice the time which is 10 percent too high" rule) is 2 times 2 hours or 4 hours after burst, *but* this is 10 percent too high; therefore, the moment 3.6 hours after burst represents the *completion* of the first half life. Hence, the difference in time between the reading of 20 r/hr (*i. e.*, 2 hours after burst) and the time when the reading is 10 r/hr (*i. e.*, 3.6 hours after burst) is 1.6 or the *duration* of the half life.

Because 1.6 hours is the one half life and this is the period of time the men remain in the area, we merely substitute in the "FIT for half life" rule the following: 5 for "F," 20 for "I," 2 for "T," and 1/10 for the one half life. By multiplying $5 \times 20 \times 2 \times 1/10$ we get 20, or 20 roentgens the total dose the men receive.

DISCUSSION

In this system there are six radiologic rules of thumb, as follows: (1) The 2-4-6 rule; (2) twice the time is one half the dose rate which is 10 percent too high; (3) Twice the time which is 10 percent too high is one half the dose rate; (4) The dose rate is the dosage for the following hour; (5) FIT forever rule; and (6) FIT for half life rule.

This system compares with the rules cited in reference 1 as follows:

1. The 2-4-6 rule. There is no counterpart in the rules of reference 1.

2. Twice the Time is One Half the Dose Rate Which is 10 Percent Too High. The counterpart in reference 1 is the first rule: "At the end of a period of time in the future equal to the time

since the explosion, the dose rate will have decayed to one half of its present value"[1]

Table 2 compares the values obtained by each of the rules, that is, by the rule presented in this article and by its counterpart in reference 1, and then compares the values of both with those obtained by the graphical method (fig. 1).[3] Examination of table 2 reveals that in all cases my 10 percent correction factor rule more closely approximates the dose rates for different moments after atomic detonation as obtained by the graphical method.[3] This method is based on data derived from dosage and dose rate curves of residual radioactivity published by the Armed Forces Special Weapons Project and is therefore considered the criterion for accuracy.

Certainly, when the estimates by the "twice-time" rule and the graphical method agree within a roentgen or so the estimates are "close enough" but when there are differences of from 10 to 20 r (as shown in table 2) it is believed wiser to adopt the attitude of the less exposure to radiation the better. Furthermore, the slightly higher values obtained by the 10 percent correction factor rule is a desirable feature because it provides an "automatic safety feature."

3. Twice the Time Which is 10 Percent Too High is One Half the Dose Rate. There is no counterpart to this rule in reference 1.

4. The Dose Rate Is the Dosage for the Following Hour. This is identical with the rule in reference 1.

5. FIT Forever Rule Although the context of this rule is identical to that of its counterpart in reference 1, the expression "FIT forever" is a memory aid and easier to memorize than: "Third rule: The maximum amount of gamma dosage which can be received in an area which has a dose rate (I) at a time (t) after the explosion is expressed by 5 times the dose rate times the number of hours since the explosion. Or, $5 \times I \times t$ is equal to the total dose from time (t) to infinite time."[1]

6. FIT for Half Life Rule. Although here, too, the thought expressed in this rule and in its counterpart in reference 1 is the same, nevertheless the application of this thought as described in reference 1 leads to values of significant deviation from the values received by means of the graphical method. This is because in reference 1 the pure interpretation of the term "half life" is not applied; instead, a looser application of "half life" is used, obviously in an effort to secure a simple "rule." This oversimplification can easily be avoided by the more accurate "twice the time is 10 percent too high" rule.

TABLE 2. *Comparison of dose rates for specified times as obtained by the first rule,[1] The "twice the time is one half the dose rate which is 10 percent too high" rule, and the graphical method[3]*

Dose rate recorded at one hour after detonation	Methods used	Estimated dose rates at specified hours after detonation		
		r/hr at 2 hours	r/hr at 4 hours	r/hr at 8 hours
1,000	F.R.*	500	225	112.5
	T.T.R.**	450	203	90.5
	G.M.***	430	195	85.0
500	F.R.	250	125	62.5
	T.T.R.	225	101	45.0
	G.M.	215	98	45.0
200	F.R.	100	50	25.0
	T.T.R.	90	40	18.0
	G.M.	90	39	18.0
100	F.R.	50	25	12.5
	T.T.R.	45	20	9.0
	G.M.	43	19	8.9
50	F.R.	25.0	12.5	6.7
	T.T.R.	22.5	10.0	4.5
	G.M.	22.0	10.0	4.2
20	F.R.	10.0	5.0	2.5
	T.T.R.	9.0	4.0	1.8
	G.M.	9.0	3.7	1.7
10	F.R.	5.0	2.5	1.75
	T.T.R.	4.5	2.0	0.9
	G.M.	4.2	1.8	0.8
5	F.R.	2.5	1.25	0.625
	T.T.R.	2.2	1.0	0.45
	G.M.	2.2	0.95	0.42
2	F.R.	1.0	0.5	0.25
	T.T.R.	0.9	0.4	0.18
	G.M.	0.9	0.38	0.18
1	F.R.	0.25	0.12	0.06
	T.T.R.	0.22	0.10	0.045
	G.M.	0.22	0.095	0.043

*First rule[1] **"Twice-time" rule ***Graphical method[3]

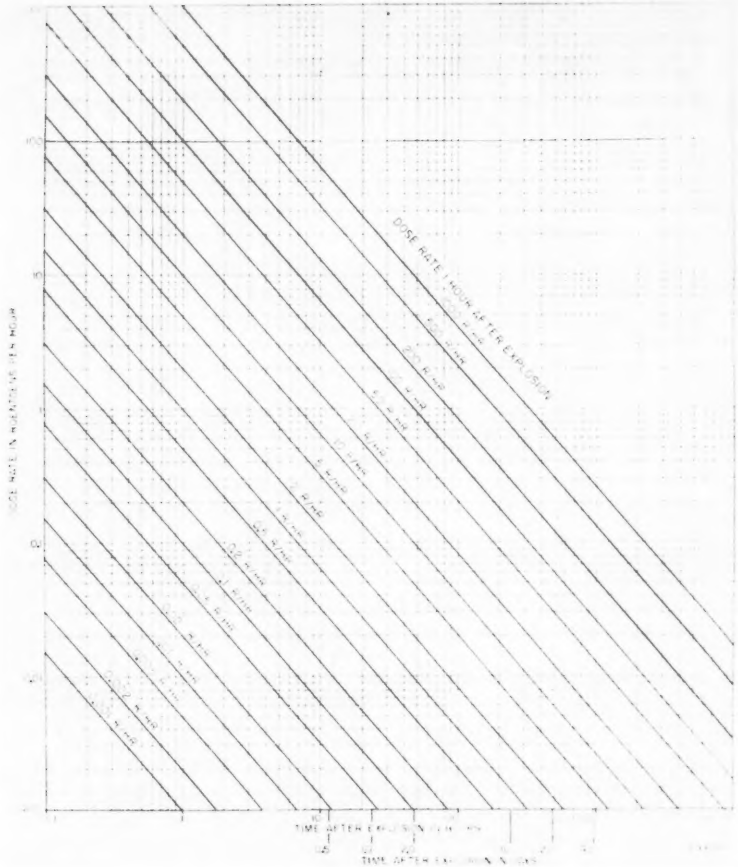

Figure 1. Dose rate versus time. Graph used to obtain the dose rate at any time after the burst when the dose rate at any other time is known. (Reproduced from Armed Forces Special Weapons Project: Dosage and Dose-Rate Curves of Residual Radioactivity *Based on Multiple Decay of Gross Fission Products. graph 1, p. 3.)*

The following illustrative problem is an example:

"The dose rate 2 hours after a detonation is 50 r/hr. What dose will be received at the end of 4 hours, 8 hours, 16 hours, 32 hours, and 64 hours?"[1]

The estimates for the time periods within 24 hours obtained by the fourth rule[1] are from 14 to 20 r lower than similar data obtained by means of the graphical method (as shown in table 3).

One might contend that a difference of about 20 r is "close enough" for practical purposes. However, one cannot deny the wisdom of the cardinal guide of *the less exposure to radiation the better*. The peacetime standard for radiation exposure is 0.3 r distributed over one week; a wartime standard might easily be 50 r distributed over the same period. It can be seen then that 20 r is 60 times the peacetime standard and represents 40 percent of the possible wartime standard. Furthermore, the problem cites the radiation which is received within 24 hours (*i. e.*, acute dosage), in contrast to the standards which relate to one-week periods (*i. e.*, chronic dosage).

TABLE 3. *Comparison of graphical method and fourth rule*[1]

Dose received at end of	4 hrs.	8 hrs.	16 hrs.	32 hrs.	64 hrs.
FOURTH RULE	50 r	100 r	150 r	200 r	250 r
Graphical Method	64 r	120 r	170 r	214 r	252 r
% Error based on the Graphical Method	−22%	−16%	−12%	−7%	−1%

The solution[1] of the above problem considers the moment four hours, eight hours, 16 hours, et cetera, after detonation to be the completion of the first, second, third, et cetera, half life respectively.

The moment after detonation that represents the completion of the first, second, third, et cetera, half-life periods can be more accurately determined by the use of our rule of "twice the time which is 10 percent too high." This rule would cite moments 3.6 hours, 6.5 hours, and 11.7 hours after detonation to be the completion of the first, second, and third half periods respectively.

In other words, if one applies the "FIT for half life" rule and considers the half-life period to be that obtained by the use of the "twice the time which is 10 percent too high" rule, a "truer" relationship between the periods and the dosage received may be observed. Thus, in the above problem, personnel would have received 50 r at the moment 3.6 hours after detonation, 100 r at 6.5 hours, and 150 r at 11.7 hours.

CONCLUSION

The radiologic rules of thumb are of value in estimating the hazards produced by radiologic contamination from an atomic

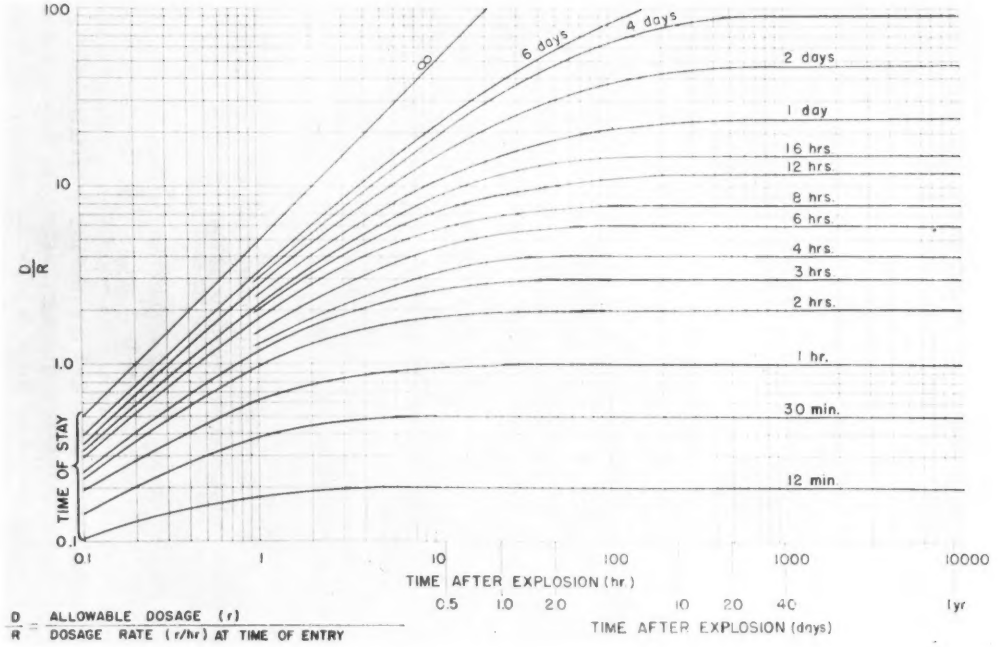

Figure 2. D/R_1 versus time after explosion for various durations of stay. Graph used in conjunction with graph 1 to solve problems involving estimated dosages. (Reproduced from Armed Forces Special Weapons Project: Dosage and Dose-Rate Curves of Residual Radioactivity *Based on Multiple Decay of Gross Fission Products. graph 2, p. 7.)*

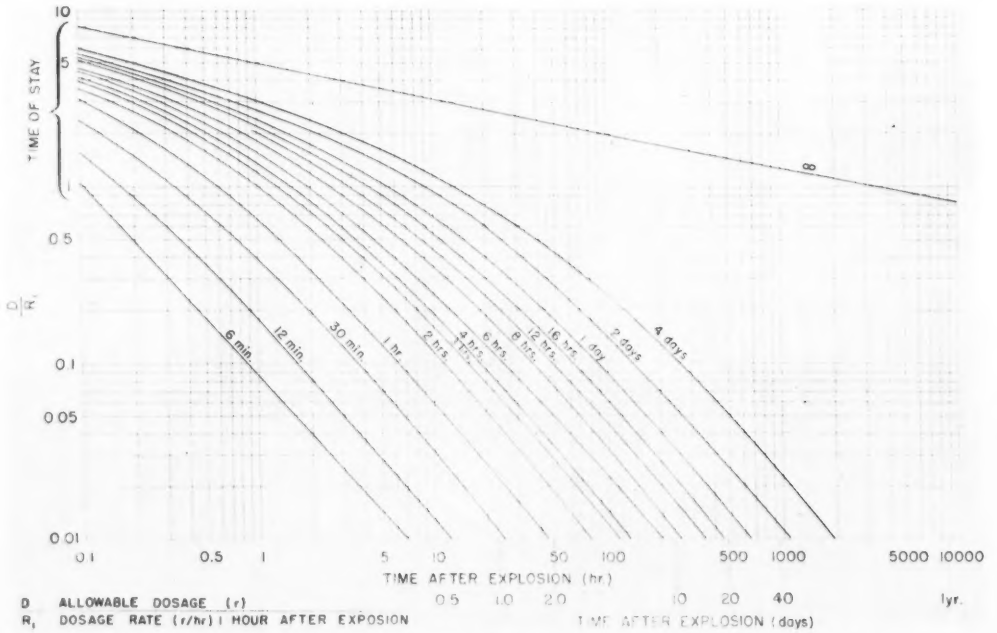

Figure 3. D/R versus time after explosion for various durations of stay. Graph used to determine the total dosage received for a particular duration of stay in a contaminated area, the dose rate of which is known at the time of entry. (Reproduced from Armed Forces Special Weapons Project: Dosage and Dose-Rate Curves of Residual Radioactivity *Based on Multiple Decay of Gross Fission Products. graph 3, p. 11.)*

detonation. These rules are used to best advantage during a period of about 12 hours after a monitor's reading and are useful in the same circumstances in which the log-log graphs[3] (figs. 1, 2, and 3) are applicable.

These radiologic thumb rules do not replace radiac instruments nor do they solve radiologic problems with pinpoint accuracy. The rules are always to be considered only as rules of thumb.

However, when a person is caught in a situation wherein he cannot avail himself of reliable instruments, monitors, log-log graphs, and so on, then these rules can be his guide in making proper decisions.

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HIGH CHOLESTEROL INTAKE AND ATHEROSCLEROSIS

Arteriosclerosis, in North Americans, begins in early infancy and the rate of lipid deposition shows three peaks, the highest in the first year of life, with lower peaks in early adolescence and early middle age. The process depends on inability of most human beings to deal with the modern high fat, high cholesterol diet. In animals very rapid atherosclerosis can be produced, even in immature individuals, by high cholesterol intake; high fat diets or fattening on carbohydrate has not been shown to lead to atherosclerosis in men or animals on low cholesterol diets with good protein content. Men with coronary disease early in life are no more obese than controls still free of symptoms.

—WILLIAM DOCK, M. D.
in *The Canadian Medical Association Journal*,
p. 363, Oct. 1953

IONIZATION CHAMBERS FOR RADIATION DATA DURING DENTAL X-RAY EXPOSURE

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A PROJECT in this laboratory, sponsored by the U. S. Air Force Dental Service, is concerned with the development of a device for making extraoral, full-mouth, panoramic dental roentgenograms. In connection with this project, it was desired to determine levels of radiation produced with the panoramic device at various points in and about the head. For purposes of comparison, measurements that would indicate radiation levels existing during full-mouth exposure with conventional dental roentgenographic technic were also desired.

APPARATUS

Because the panoramic method employs a narrow beam of roentgen rays in making exposure, an ionization chamber of small volume was required. Such a device was found in the Sievert ionization chamber,[1,2] which has an air volume slightly in excess of 30 mm.[3] and a physical size which was easily accommodated in the specimens to be irradiated. The Sievert chamber (figs. 1 and 2) is a condenser type R meter, having a wide range of sensitivity dependent on the charge applied, and can be relied on to produce measurements accurate to within ± 10 percent at the energies used in this experiment. All voltage measurements after charging and after exposure to radiation were made using the Kiethley electrometer. Using calibration curves previously prepared for each chamber, and corrections for atmospheric pressure and temperature, radiation levels to which the chambers had been exposed were calculated.

The roentgen-ray source was a standard roentgenographic unit, operated at 65 kv. and 10 ma., having ½ mm. Al. equivalent inherent filtration, to which was added 1 mm. Al. The half value layer was about 1.5 mm. of aluminum.

A wax phantom head was constructed about an adult human skull. The wax was of tissue-equivalent density to roentgen rays and consisted of a mixture of 50 percent paraffin and 50 percent beeswax by weight to which was added 2 percent by

From the Dental Research Section, National Bureau of Standards, Washington, D. C., with the co-operation of the Naval Medical Research Institute, Bethesda, Md., and particularly Lt. James W. Duckworth (MSC) USNR and Lt. (jg) Robert Sharp (MSC) USN.

weight of rosin.[3] The phantom was constructed to permit access to points within the head for the placement of the ionization chambers (figs. 3 and 4).

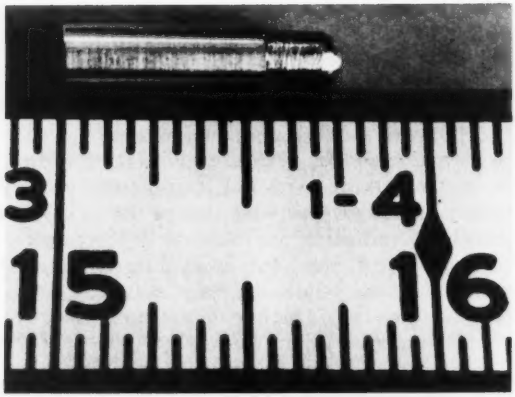

Figure 1. Sievert ionization chamber, showing small size (scale in inches).

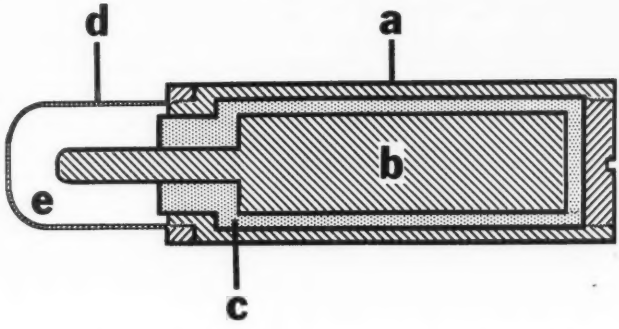

Figure 2. Sievert ionization chamber. (a) Outer shell. (b) Inner condenser element with antenna. (c) Dielectric. (d) Thin-walled cap. (e) Air chamber.

EXPERIMENTAL METHOD

Ten points at which to measure radiation levels were chosen. Several of these were selected because they are located in areas rich in lymphoid or glandular tissue. Points at which overlap or intersecting planes of radiation might be expected were also included. These points were: (1) at the "skin" of the neck when using the panoramic exposure and at the "skin" of the cheek when using conventional exposure; (2) in the region of the sella

turcica; (3) in the region of the parotid gland; (4) in the sublingual region; (5) in the center of the base of the tongue; (6) in the cornea of the eye; (7) in the region of the thyroid gland; (8) in the deep cervical lymphatic region; (9) in a lower bicuspid tooth socket; and (10) at a point just posterior and medial to the lower

Figure 3. Wax phantom showing placement of ionization chamber at "skin" of cheek and recessed location for measurements in region of neck lymphatics.

third molar. The last-mentioned location was included because the axis about which the beam of roentgen rays was rotated during panoramic exposure passed through this point. It was desired to determine if any excessive concentration of radiation occurred at this center of rotation.

Rate of delivery from the filtered roentgen-ray source was about 558 milliroentgen (mr.)/sec. in air at 12 inches from the target when using the slit or narrow beam in the panoramic technic, and about 647 mr./sec. in air at the same distance when using a round cone of rays for the conventional intraoral technic. Delivery rates were measured using the Sievert chambers.

Skin-target distance was 8 inches when using the standard intraoral 14-film radiographic method and varied from 8 to 12.5 inches, depending on the position of the roentgen-ray source at any given time in its cycle of motion about the head during

roentgenography by the panoramic method. Total exposure time was 25 seconds with the panoramic technic and 40.5 seconds with the intraoral method.

In each full-mouth exposure included in this experiment, the conditions that would exist during actual clinical practice were adhered to. Standard lead-backed dental films were positioned in the phantom for each single exposure by the conventional technic. One series of 14 exposures was found to be sufficient to produce

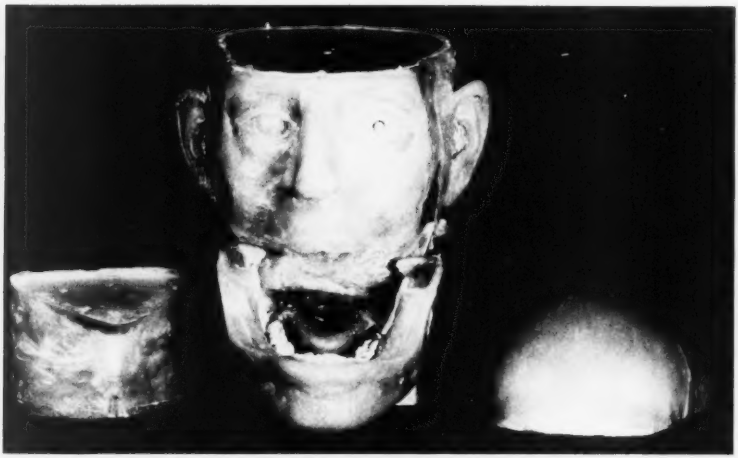

Figure 4. Wax phantom disarticulated for placement of ionization chambers at internal points.

radiation levels at all measuring points falling within the range of the ionization chambers. It was necessary to repeat the exposure 10 times when using the panoramic method in order to obtain levels of radiation that could be reliably measured by use of the same chambers.

With the panoramic method, the total skin surface area exposed to radiation at any point in the exposure cycle was less than 1 square inch. During exposure by conventional methods, about 12 square inches of skin area were irradiated during each individual film exposure, and overlapping of irradiated areas is unavoidable during a series of films required for full-mouth roentgenography.

RESULTS

Levels of radiation measured at the points selected are graphically shown in figure 5. It will be noted that under the conditions of this experiment, the highest level of ionizing radiation during full-mouth roentgenographic exposure with the panoramic technic existed in the cervical lymphatic region of the neck and amount-

ed to 0.42 r. The highest levels of radiation when using conventional intraoral roentgenographic technic existed at the "skin" of the cheek and in the region of the thyroid gland, where 23 and 27 r, respectively, were recorded.

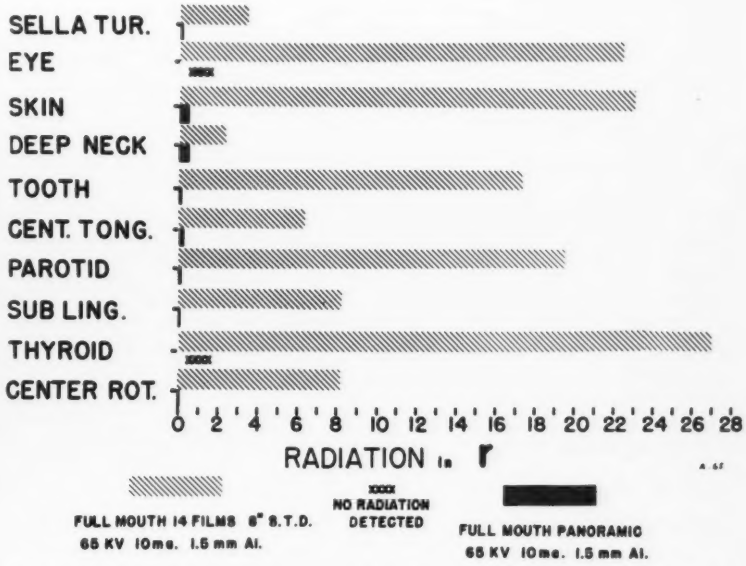

Figure 5. Levels of radiation measured at 10 selected points in and about the human head phantom, using a conventional and a panoramic full-mouth roentgenographic technic.

SUMMARY

Levels of ionizing radiation produced at points in and about a wax phantom of the human head were measured during full-mouth dental radiography by a panoramic method and by a conventional 14-film intraoral technic. In this study small volume ionization chambers were found to be useful in measuring radiation developed during dental x-ray exposure.

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PSYCHIATRIC REPROFILING IN BASIC TRAINING CENTERS

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THE Army Regulation which establishes standards for the physical profile for enlisted men is AR 40-115, dated 20 August 1948. Its title is "Medical Department, Physical Standards and Physical Profiling for Enlistment and Induction." Paragraph 12 of this regulation gives the P U L H E S system, or "Physical Profile Serial Chart," the "S" section of which is entitled "Neuropsychiatric." It specifies that a man with a "mild transient psychoneurotic reaction; or, mild character and behavior disorder; or, borderline mental deficiency" is given an S-2 profile.

The purpose of profiling is to allow the assignment of those with mild disabilities to limited duty. While the profile system is meant to be a useful guide in determining the work potential of a man, we must admit that in the field of psychiatry, and this includes military psychiatry, the functional gradations between a person who is normal and one who has a clear-cut psychiatric disorder has not been clearly defined nor classified. The matter is even hazier when the psychiatrist attempts to distinguish the normal from the mildly abnormal, and then tries to assess the extent of the disability caused by a minimal abnormality. To make matters even more complex, the criteria separating the S-1 (normal) from the S-2 categories in the profile serial chart may be misleading if one thinks only in terms of diagnosis rather than of function. As soon as one begins to contemplate function as the basis for profiling, one starts to suspect that the difference between the S-1 and S-2 categories may be illusory in many instances, and certainly extremely difficult to predict before a man has had even a trial of duty. In this connection, it is interesting to note that, in our experience, most military psychiatrists make little or no use of the S-2 category, preferring either to give a man no protection (S-1 profile) or maximum medical protection (S-3 profile). This neglect of the S-2 category is not universal, however, and leads to some interesting developments.

From Mental Hygiene Consultation Service, Fort Knox, Ky. Maj. Clemments is now assigned to 2d Field Hospital, APO 108, New York, N. Y.

The induction centers generally fill up training divisions or centers within a specified geographical area with groups of inductees. A civilian coming up for induction or enlistment is given, along with his routine physical examination, a screening neuropsychiatric examination. At that time, his complete physical profile is determined and recorded for the future guidance of training center personnel.

Late in November 1952, of a group of such men from one of the induction centers, the Third Armored Division Classification and Assignment Officer found that 103 men had S-2 profiles. The "S" category was the only portion of the profile rated below 1 for most of these men. These men with an S-2 profile created a difficult problem for him, because such men are not considered fit to be assigned a military occupational specialties code number for combat. The only sensible recourse locally available was to send them to companies conducting an 8-week basic training period (an abbreviated form of the 16-week cycle) and, on completion of the 8 weeks, to one of the Army common specialist schools in order to fit them for noncombatant duties.

These men formed the bulk of those admitted to the Army common specialist schools from the Division. Other considerations, such as the Division's need for specialists and requirements of the school for intelligence, aptitude, previous civilian experience, or motivation of the student soldier, had to be relegated to a position of secondary importance. The Division could not send other men, with normal physical profiles, to the schools, even though their qualifications were often much better. To sum up, the psychiatrist at the induction center, by his low profiling, unwittingly had set up the major criterion for deciding whether a man be trained for combat or for combat-support roles.

The chief of the Mental Hygiene Consultation Service (MHCS) suggested a method of relieving this situation. After securing proper authority all induction S-2 profiles were automatically changed to S-1 at this post.

This was based on the assumption that a man cannot properly be given an S-2 profile at the time of induction, because the physician at the induction station has (1) little basis for making such a fine discrimination between an S-1 and an S-2 category; (2) a limited amount of social history on each man and consequently is unable to judge what a man's past performance has been; (3) many men to screen in a short time, and consequently cannot evaluate a man's psychiatric status unless there is a marked disorder of affect, ideation, or behavior; and (4) difficulty in predicting the reactions of the men to the shades of environmental stress which will influence them during their Army

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service. In the face of the above difficulties, it would seem that, when it comes to giving an S-2 profile, the decision at the induction station can only be a matter of guesswork or intuition.

DEVELOPMENT OF THE STUDY GROUPS

Following the automatic reprofiling, the Classification and Assignment Office reassigned about 50 percent of the above mentioned 103 men to a normal 16-week basic training cycle. The others remained in the abbreviated 8-week cycle.

It was thought that a comparison of the adjustment made by two such groups would offer an opportunity to evaluate the wisdom of the profile change, particularly because it is general opinion that men with mental or emotional disorders do not function as well in a normal 16-week cycle as they do in the briefer 8-week cycle. A statistical comparison of two such groups in regard to company character and efficiency rating, and the incidence of sick call, hospitalization, referral to the MHCS, courts-martial, company punishment, AWOL, discharge from the Army, and successful completion of basic training might help to confirm or dispel such an opinion.

EXPERIMENTAL METHOD

In this study primary records and basic training company evaluations were collected and analyzed. No interviews were held with the men concerned because it was thought wiser that they should not even be aware of the reprofiling. It was also assumed that these soldiers would, within the 8 to 16 weeks of their basic training, come to the attention of the Mental Hygiene Consultation Service if the reprofiling created difficulties for them.

As all men were assigned to the Third Armored Division from induction centers, Classification and Assignment Branch immediately identified all those with S-2 profiles and prepared the profile changes to S-1 which were then signed by the chief of the MHCS. Within a few days, Classification and Assignment Branch assigned these men according to their individual qualifications and the needs of the Division. When we received this information we placed each man in one of the two groups, depending on whether he was assigned to a 16-week cycle or an 8-week cycle. The assignment was made by Classification and Assignment Branch independent of any influence by us. The case samples consisted of 415 men divided into two groups, one with 192, and the other with 223. The former group was trained in an 8-week cycle, followed by 8 weeks of schooling. In addition to their original S-2 profile, 60 of the men trained in the abbreviated cycle had low profiles in other categories. The latter group was trained in a normal 16-week cycle. The training of these groups was spread

out evenly from December 1952 to December 1953, so that seasonal variations had little influence on the results obtained. No matching was made of intelligence, urban or rural rearing, previous occupation, education, or race.

Company contacts were made by one of us, a psychiatric social work officer. A psychiatric social work technician accompanied the officer for the purpose of screening company records while the officer held the evaluation interviews with a person in responsible authority in the company, usually the company commander. These contacts were made either two days before graduation or within the week after graduation. Information was obtained before the company commander was informed that the men originally had S-2 profiles. It was believed that this procedure, had little or no influence on the soldier's completion of basic training or on the company commander's evaluation. This company contact provided the material on the company commander's qualitative evaluation, as well as information concerning AWOL's, courts-martial, company punishments, discharge, and success or failure of the soldier's completion of basic training. The morning reports (DA Form 1, dated 1 August 1951), were studied in order to obtain much of the company data.

The questions proposed to the responsible person in the company by the psychiatric social work officer in regard to the evaluation of each trainee were as follows:

1. What do you think of this trainee's character and efficiency? (Don't know, unsatisfactory, average, or excellent.)

2. Did you attempt to utilize this trainee in any leadership capacity? (Yes or no.)

3. If you tried this trainee in a leadership capacity, was he successful or unsuccessful in demonstrating leadership qualities?

4. Will this trainee successfully complete, or has he successfully completed, basic training, or not?

5. Do you think this trainee would be successful or not as a combat soldier?

6. Would you, or would you not, desire to have this trainee work for you after he has completed basic training?

Dispensary records were then examined. Trainees of certain companies regularly attended a single dispensary throughout their period of basic training. Frequency of sick call for each man was tabulated, and note made of any hospitalization. At the hospital, dates of hospitalization, diagnoses, and dispositions were secured. Discharge Branch, Third Armored Division, was then

asked for a record of all instances of discharge, along with reasons for discharge. Finally, the files of the MHCS were studied for the entire year under consideration. Those in the two groups who had been referred to the MHCS along with their final diagnoses and dispositions were noted. The collection of information from these sources supplied the raw data for this study.

RESULTS

In a number of the company contacts, the investigator sought the company commanders' opinions of the trainees who formerly had an S-2 profile. For the most part, they confirmed our general impression that the original profile would have prevented many inductees from becoming combat soldiers. To quote one officer, "No reason for these men having an S-2 profile. They are some of the best men in the company." This opinion was more prevalent among company commanders in the 16-week training cycle.

Generally, one obtained the impression that morale, both of cadre and trainee, was better in the 16-week training cycle than in the 8-week cycle. The soldiers in the 16-week cycle seemed more eager, possessed more vitality, had more bravado and a more purposeful air. Being identified as part of a combat branch of the Army apparently exerted a beneficial influence. Closely allied to this was the impression that the commanders of the 8-week training cycle companies appeared to have had less basic interest in their men. The tacit attitude seemed to be that the trainee was already lost from a combat branch, and hence future school success depended little on the 8-week basic training cycle. Therefore, it appeared that only superficial concern was given to the points of training, especially those related to combat. On the other hand, commanders of 16-week training cycles seemed to feel a direct responsibility for the man's successful graduation, because they realized that what a trainee learned in basic training might later save his life, his company, or his mission in combat.

Originally, we thought that two company contacts for evaluation interviews in the 8-week cycle would be practical; the first at the end of the 8-week basic cycle, and the second at the end of the schooling cycle. The first contact proved valuable, but we soon found that the second contact at the end of schooling was of little use, because in the school phase the company commander had little except administrative contact with the men. Furthermore, because he might have as many as 500 men in his company, it was practically impossible for him to make an individual evaluation of every man. We therefore discontinued company evaluations for the school period of those men who had been in the 8-week training cycle. The evaluation interview was the only measure that did not cover a 16-week period for the 8-week cycle

group; all other indexes, sick call, et cetera, were for a 16-week period comparable to that of the 16-week basic training group. Sixteen men in the 8-week training cycle group had subsequent schooling at other posts, making it impossible to follow up this segment of the group for any further investigation during their school training.

In obtaining company evaluation, it was first thought that only the company commander should be interviewed. This too was found to be impractical for various reasons. Consequently, in revising the approach, the concept of immediate rather than ultimate authority was used. This meant that any company officer, or the administrative or field first sergeant, was eligible to give the evaluation. In many cases we discovered that a first sergeant's knowledge of his trainees was the best available in the company. The ideal evaluation situation, encountered a few times, was the presence of the company commander, other company officers, the first sergeant, and the platoon sergeant, all of whom contributed to the evaluation.

Most of the company commanders were junior officers, and appeared to be in their early twenties and recently commissioned. It seemed that such younger officers had an eager, individual interest in their men, and consequently based their evaluations on participating observation rather than on the fact that a trainee had come to their attention because of some particular deficiency or some outstanding quality.

When people other than the company commander gave the company rating, an added difficulty was their occasional reluctance to divulge information if it might reveal a difference of opinion from that of the company commander. In all these cases, the person being interviewed was asked to inform the company commander of the team's visit, and was requested to telephone us if there was any objection to the original rating. In no instance did anyone call to change an evaluation.

Company punishment, courts-martial, and AWOL figures were found to be of limited value. The company commander's attitude toward discipline, as reflected by the data obtained in these categories, was found to cause a large variation. For example, one company commander might conscientiously use company punishment literally, as directed by Army Regulations or local policy. Such a commander would have on record a large file of misdemeanors. Other company commanders, thinking perhaps that a large number of company punishments, courts-martial, or AWOL's might reflect adversely on their competence as leaders, appeared to avoid the permanent recording of these events, and consequently would use their own unofficial methods of handling such situations. Further, in some instances it was found that,

because company punishment records were destroyed as soon as a soldier was transferred out of the company, the team missed obtaining these figures if they arrived even one day late. A certain number of these files were consequently lost to the study. Courts-martial figures were an added source of error. It was found that in many instances there was a considerable time lag between offense and ultimate trial. We believe that the records did not reveal a true picture because, even though an offense may have been committed during basic training, many courts-martial took place after graduation and hence could not be made a part of our records.

Other primary records required by Army regulations, *i. e.*, the morning reports, dispensary records, hospital records, Discharge Branch files and MHCS files, were the most reliable sources of information. Standard procedures led to fairly uniform recording, and systems of filing differed little from office to office. As a result, full and accurate information was obtained in all these areas.

TABLE 1. *Chi-square analysis of company evaluation*

Criterion	Degrees of freedom	χ^2	p	Significance
Character and efficiency	3	4.83	.20	No difference
Trial as leader	1	8.55	.01	More 8-week subjects tried as leaders
Success as leader	1	0.02	.90	No difference
Completion of basic training	1	1.50	.20	No difference
Estimate of combat effectiveness	1	7.88	.01	16-week subjects rated better
Desirability as worker	1	0.37	.60	No difference

It can be seen from table 1 that in certain areas there was no significant difference between the two groups. This table, however, does show two significant differences: more trainees in the 8-week group were given opportunities for leadership positions than were those in the 16-week group, and significantly more trainees of the 16-week group were considered likely to be successful in combat than were those of the 8-week group.

Table 2 shows that the 8-week group had a significantly higher rate of discharges than did the 16-week group, though the number discharged in either group was so small as to be hardly worth while analyzing statistically. All discharges were for medical reasons, and none for clear-cut psychiatric reasons.

As indicated by the data in table 2, the only significant changes noted are that the 16-week group had a larger number of trainees who went on sick call more than five times, as contrasted with the 8-week group. The numbers involved, however, were small. Also, the AWOL rate is higher in the 16-week group than in the 8-week group. Again the increase is rather trivial, only six beyond statistical expectancy.

TABLE 2. *Chi-square analysis of primary records*

Record	Degrees of freedom	χ^2	p	Significance
Discharge rate	1	4.00	.04	More 8-week subjects discharged
Hospitalization	1	0.00	.99	No difference
MHCS referrals	1	0.01	.95	No difference
Sick call*	1	1.17	.30	No difference
Sick call**	1	7.89	.01	More 16-week subjects on sick call
Courts-martial	1	0.13	.25	No difference
AWOLs	1	6.25	.02	More 16-week subjects AWOL
Company punishment	1	2.39	.12	No difference

*One or more sick call visits.
**Over 5 sick call visits.

CONCLUSIONS AND DISCUSSION

In rating the trainees of this study the company commander had no knowledge of their previous S-2 profiles and was comparing them with other trainees in his company. In the 16-week training companies the subjects were competing with men who had had normal physical profiles from the very outset of their Army service, whereas those in the 8-week training companies were competing, in many instances, against men with acknowledged limitations. The data from table 1 indicate that the 16-week trainees compared just as favorably as did the 8-week trainees against their respective competition. It appears, then, from the viewpoint of the character and efficiency rating, that men formerly profiled with an S-2 rating will function just as well in a 16-week cycle as will those in an 8-week cycle followed by school training.

Within the limitations imposed by the sampling of the present study and the relatively brief period of Army service concerned, the change of profile from S-2 to S-1 seems to have been justified.

For some reason not readily apparent, a significantly larger number of subjects in the 8-week cycle than in the 16-week cycle

were given a trial in some leadership capacity. We can offer no explanation for this. However, when tried in a leadership position, members of both groups of trainees were equally successful. Thus it seems that, once given the opportunity, those in the regular combat training group will succeed in leadership positions just as well as will those in a more protected situation (8-week cycle).

Table 1 clearly indicates that as many men with former S-2 profiles completed basic training in a normal 16-week cycle as did those in a protected, less stressful 8-week cycle. This again bears out our contention that men with S-2 profiles can in large part satisfy the demands of normal basic training for combat.

Table 1 also indicates that the men in the 16-week cycle were rated more ready for combat than were those in the 8-week cycle. This might be expected, however, because all training in the 16-week cycle is directed primarily at combat preparedness, whereas in the 8-week cycle training seems to be directed at "getting the men through" so that they can get on to their schooling. Also, the company commanders of the 16-week training cycles tend to identify themselves more strongly with their trainees and have a greater desire for the men to be ready for combat assignments than do those commanding the 8-week cycles. This may prove an interesting problem for further research.

Table 1 indicates that there is no difference between the two groups as far as their desirability as workers is concerned. Thus, in spite of the fact that the trainees in the 16-week cycle were subjected to more rigorous demands in training, they seemed to stand up as well as did those in the 8-week group.

Table 2 indicates that the subjects of the 16-week cycle had a lower discharge rate than those of the 8-week cycle. An extremely small number of men, however, were discharged in either group. The meagerness of this data caused us to believe that these figures are statistically untrustworthy; consequently, the differences in the two groups are probably not really of much importance.

Table 2 further indicates that the subjects of the 16-week cycle had no greater frequency of hospitalization, referral to the MHCS, or absolute attendance at sick call than did those in the 8-week cycle. We believe that this demonstrates that, even though the trainees with former S-2 profiles were subject to greater and more prolonged stresses of training in the 16-week cycle, they had, as a group, no more medical complaints than those in the more protected, less stressful 8-week cycle.

Table 2 indicates that there were significantly more subjects in the 16-week cycle who had been on sick call five times or more

than there were in the 8-week cycle. We believe that this demonstrates that there were certain men in the 16-week cycles who attempted, whether justifiably or not, to evade training through medical channels. In our opinion the added risk of increasing the number of such persons (presumably related here to the greater physical tasks required in the 16-week cycle of training) is more than compensated for by the releasing of 415 men from the limitations imposed by their S-2 profiles.

Table 2 shows that the subjects of the 16-week cycle had no greater frequency of courts-martial or company punishments than did those in the 8-week cycle. We interpret this as meaning that the men subject to the greater stresses and more rigid discipline of the 16-week cycle had no more infractions of military law requiring official punishment than did those in the apparently more relaxed atmosphere of the 8-week cycle. This again leads us to believe we were justified in changing the subjects' profiles to S-1.

Table 2, however, does indicate a definitely higher rate of AWOL's in the men of the 16-week cycle. We believe that, at the risk of increasing the AWOL rate, presumably by subjecting the trainees to the increased stresses of the 16-week cycle, it was of value to change the profiles to permit a broader use of their talents in the military service.

Taking all of the data into consideration, this study has shown that men with former S-2 profiles performed about as well in a regular basic training company of 16 weeks' length as did those in a modified training company of 8 weeks' length followed by 8 weeks of Army common specialist schooling. The only risks added by placing them in a 16-week cycle were to increase the number of those making frequent sick calls and the number of AWOL's. Because these factors affected only a relatively small number of men, they were believed to be outweighed by the advantage gained of adding 415 men to the combat potential of the Army. One must be cautious in attempting to interpret the results of this study as necessarily indicating that all men who are given an S-2 profile at the time of induction will perform adequately under the severe stresses of combat, but it can be reasonably concluded that it is profitable to the Army to automatically change the S-2 profiles given to men at the induction centers in order to permit their fuller and broader use in the military service, insofar as this has been shown to be true in basic training.

SUMMARY

This is a study of 415 men with induction-station-assigned S-2 profiles and of their performance in basic training after an automatic reprofiling to S-1. This study shows that these men could perform nearly as satisfactorily in a normal basic training cycle of

16 weeks as they could in a specially modified training cycle of 8 weeks plus Army common specialist school training, with the exceptions that they tended to go AWOL more frequently and some of them tended to make frequent sick calls. Because of the generally good performance of all inductees and enlistees with S-2 profiles, it appears justifiable to reprofile them automatically to S-1, so that they may be placed in an unlimited duty status.

WHY IS GOLD INFERIOR TO SILVER IN MILITARY INSIGNIA?

The ranking of silver (lieutenant colonel and first lieutenant) over gold (major and second lieutenant) was not deliberate. The first insignia, the stars for generals in 1780 and the eagle for colonels in 1832, were of gold, for use on epaulets. When shoulder straps were first adopted in 1836, they were prescribed with both silver and gold borders for various branches of the service. For example, for infantry the borders were of silver, for artillery of gold. It was provided that a lieutenant colonel should wear a leaf at the end of the strap of the same metal as that of the border, and that the major should have a similar leaf of the opposite metal from that of the border. The captain's double-bar, the first lieutenant's single bar, and the other insignia were to be of the same metal as the border. The second lieutenant wore a blank shoulder strap without insignia.

In 1851 all the silver borders on shoulder straps were abolished and it was provided that the insignia should be of silver for lieutenant colonel and all higher ranks, and of gold for major and all lower ranks. On epaulets, however, all insignia were of silver, but different lengths and size of fringe were provided for the epaulets of field officers and those of company officers, and, although the epaulets of both major and second lieutenant were left blank, there was no confusion because of the major's longer and larger fringe.

In 1871 the epaulet was replaced by the shoulder knot. As only one style of shoulder knot was to be prescribed, there was need for an insignia for major, and it was natural to take the gold leaf from the shoulder strap. At the same time the bars of captain and first lieutenant were changed to silver.

With the advent of the olive drab uniform, the insignia was removed from its gold-bordered setting and attached direct to the uniform. This left the second lieutenant without any distinctive mark of recognition. Several suggestions were made, but the simplest seemed to be to adopt the same idea as the gold and silver leaves, indicated, so the second lieutenant was given a gold bar by special regulations in 1917.

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COMPLICATIONS OF ANESTHESIA DUE TO ERRORS IN JUDGMENT AND TECHNIC

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COMPLICATIONS of anesthesia due to errors in judgment and technic do occur, and may be fatal. Thus in a statistical survey of 10 hospitals in the Washington area, a total of 47 anesthetic deaths were reported for a 2-year period.[1] Of these, 39 (83 percent) were considered preventable. A further analysis of these deaths revealed that there were glaring deficiencies in the attempts to resuscitate the patients.

The importance of this subject merits a discussion of the complications of anesthesia and their management. Although the death rate from general anesthesia is low when the agent is under the management of well-trained anesthesiologists, there is need for the physician, who may be required to administer an "occasional anesthetic," or resuscitate an acutely ill patient, or to supervise or assist nurse anesthetists in hospitals in the field, to be familiar with all potentially dangerous situations.

All residents training in Army hospitals who have entered the field of surgery and allied specialties, since 1 July 1954, are given a minimum of 30 days' instruction in anesthesiology as an adjunct to and as an essential part of their specialty training. Such a program has been instituted by the anesthesia and operative service of this hospital, where first-year residents in surgical specialties are instructed in the theory, administration, and safe practices of anesthesia.

ANOXIA

Courville[2] observed that anoxia is the greatest hazard in anesthesia. Mousel and associates[1] were even more outspoken. They contended that the transient complications of anesthesia are all due to anoxia subsequent to one or another of the mechanisms which produce it; for example, respiratory obstruction, emesis, pulmonary edema, overdose of anesthetic agents, and convulsions. They further contended that few anesthesias progress in average hands without some degree of anoxia being experienced

From Walter Reed Army Hospital, Washington, D. C.

by the patient. Failure to adequately treat or to reverse the early anoxia is followed by advanced anoxia associated with well-established circulatory, pulmonary, and cerebral complications.

A vivid demonstration of the poor tolerance of the body to anoxia is seen in studies on the effects of the lack of oxygen on the brain.[1,3] Cerebral anoxia of only 10 seconds' duration can cause loss of consciousness; 20 seconds causes a cessation of certain electrical waves seen on the electroencephalogram; and 3 to 5 minutes causes irreversible cerebral damage which may be manifested by confusion, amnesia, dementia, or a decorticate or decerebrate-like state.

Anoxia can also produce other lasting and deleterious effects. A damaged liver can be further damaged, a diabetic acidosis intensified, and a weakened heart may suddenly fail. Even death may be precipitated by a brief period of acute anoxia superimposed on a chronic anoxia such as that present in certain long-standing pulmonary and cardiac diseases.

RESPIRATORY COMPLICATIONS

There are a number of "minor complications" that arise during the induction and maintenance of anesthesia. If these minor situations are corrected early and promptly, the more severe and permanent complications may be avoided. Prolonged breath holding, coughing paroxysms, and laryngospasm are among the common complications of anesthesia. Breath holding occurs during stage II and is usually due to irritation of the respiratory passages by the anesthetic agent. It is best corrected by decreasing the concentration of the agent, or removing the irritant entirely for a brief interval. Coughing paroxysms and laryngospasm may be produced in the same manner as breath holding. Mechanical stimulation and extrinsic stimulation without adequate reflex depression are additional causative factors in laryngospasm.

The following are some of the methods for prevention and treatment of laryngospasm: (1) avoidance of sudden increases in the concentration of anesthetic agents, (2) providing preliminary topical analgesia of the pharynx and larynx, (3) delaying introduction of an airway or laryngoscope until the anesthesia has progressed to that plane of surgical anesthesia in which the pharyngeal and laryngeal reflexes are obtunded (fig. 1), (4) maintaining the head and neck in a position of modified extension to ensure an unobstructed oropharyngeal airway (hyperextension of the head and neck without elevation of the occiput may occlude the airway due to compression of the larynx by the tense anterior cervical muscles), and (5) permitting the patient to exhale against a slight positive pressure of a high oxygen mixture to aid in relax-

ing the spastic vocal cords. In protracted cases of laryngospasm, it may occasionally be necessary to proceed with tracheal intubation with the aid of short-acting muscle relaxants.

Other common disorders of respiration during anesthesia, such as hyperpnea, trachypnea, dyspnea, and apnea require early attention and corrective measures. Hyperpnea is commonly caused by carbon dioxide excess, painful stimuli under light anesthesia, local stimulating action of the anesthetic drugs, and excitement during induction. The causes of tachypnea are essentially those

STAGES OF ANESTHESIA			DEPRESSION OF REFLEXES IN RELATION TO LEVEL OF ANESTHESIA
I. ANALGESIA			CONSCIOUSNESS RETAINED, SENSORY DEPRESSION
II. HYPERACTIVITY (DELERIUM)			ALL REFLEXES HYPERACTIVE, LOSS OF CONSCIOUSNESS
III	1	LIGHT SURGICAL ANESTHESIA	EYELIDS, CONJUNCTIVA, CUTANEOUS, BONES AND JOINTS
	2		PHARYNGEAL, GAG, SWALLOW, COUGH
	3	DEEP SURGICAL ANESTHESIA	LARYNX, MESENTERY, VISCERA, CORNEA, PERITONEUM, CELIAC
	4		VASO-MOTOR CONTROL, CARINA, RESPIRATORY CENTER
IV. TOTAL ANESTHESIA			AREFLEXIA, MEDULLARY PARALYSIS

Figure 1.

of hyperpnea, but this condition may become more important clinically because of the excess respiratory effort with a decrease in ventilatory efficiency. Dyspnea in its true form does not occur under anesthesia, because by definition it is a subjective condition. It is not uncommon, however, to observe labored or noisy respirations. These conditions are usually a sign of varying degrees of respiratory obstruction and are always abnormal. Respiratory obstruction is quickly followed by anoxemia and carbon dioxide retention. It is imperative that treatment be instituted early while these conditions are still safely reversible. The signs of respiratory obstruction, with its secondary anoxemia and hypercarbia are an elevation of blood pressure, a primary increase in pulse rate, and cyanosis. The causes of respiratory obstruction

are (1) relaxation of pharyngeal and laryngeal tissues which permit the tongue to fall back into the hypopharnyx, (2) improper positioning of the head and neck, (3) defective or improperly adjusted apparatus, (4) anatomic abnormalities of the respiratory tract, (tumor, polyps, scar contractures), (5) foreign bodies or excess secretions, (6) laryngospasm or bronchospasm, (7) inhibition of the respiratory movements of the thorax and diaphragm (tight cast, malposition, "leaning on the patient," and other restricting factors). The treatment of respiratory obstruction is directed first of all toward localizing and eliminating the cause of the obstruction. The obstructing factor may be removed simply by repositioning the head or it may be complicated so as to require emergency tracheotomy to re-establish the airway that has become occluded by aspirated material, laryngeal edema, or neurologic or inflammatory lesions.

APNEA

Apnea, or complete absence of respiratory movements, can be due to a number of factors. It may be secondary to breath holding, a sudden overdose of a stimulating drug, laryngospasm, paroxysms of coughing, or respiratory obstruction. Other factors to consider are (1) hypocapnia, due to hyperventilation and subsequent lowering of the carbon dioxide stimulus below the respiratory center threshold; (2) high concentration of oxygen administered in the presence of oxygen want with discontinuance of carotid body effect on the respiratory center; (3) neurologic disturbances, such as increased intracranial pressure; (4) cardiocirculatory failure, with resulting central nervous system hypoxia; (5) overdosage of either anesthetic agents or supplementary drugs; and (6) reflexes of autonomic or somatic origin. Voluntary swallowing movements, accompanied by momentary cessation of respiration as seen in stage I anesthesia, should not be confused with apnea from other causes.

All patients in apnea must have ventilation instituted immediately. This ventilation is best accomplished by rhythmic compression of the breathing bag every 3 or 4 seconds to ensure adequate tidal exchange. It is most important that a rational diagnosis of the existing condition precede further treatment. A calm approach to the problem is both essential and practical, for with an adequate airway and stabilized circulatory status the patient will be receiving maximum supportive therapy until the cause of the apnea can be determined and corrected. It is in this early phase that most attempts at resuscitation in the survey made by Mousel and associates were deficient. Ventilation with oxygen was used early in only 10 of the 39 deaths reported in their survey, and in 12 patients the only attempts at resuscitation were by manual compression of the thorax even though an anesthesia machine was available.

RESUSCITATION

If a primary circulatory collapse occurs, as evidenced by absence of pulse, blood pressure, or heart action, cardiac resuscitation must be instituted immediately. Care must be taken to distinguish primary circulatory collapse from the circulatory depression which occurs with an overdosage of anesthesia or severe overstimulation of the autonomic nervous system. If the apnea is due to an intracranial lesion it would be best to discontinue all anesthetic drugs, ventilate and oxygenate the patient, and continue surgery (with local anesthesia if necessary). The treatment for an overdosage of inhalation anesthetic is to establish respiratory and circulatory support as indicated. The anesthetic mixture and dosage received by the patient must be verified to rule out hypoxia caused by an excess of any agent. In the event of overdosage, the alveolar concentration of the anesthetic agent may be reduced by dilution with high flows of oxygen and repeated emptying of the breathing bag. Barbituate overdosage is treated by providing respiratory and circulatory support until the agent is metabolized or eliminated. Overdosage of narcotics is treated in the same manner, and N-allylnormorphine is given to counteract the depressant effects on the respiratory center. Hypocapnia is not significant unless it is severe enough to affect the central cardiac pressor mechanism and is accompanied by circulatory depression. In the presence of marked hypotension, carbon dioxide replacement may be necessary and can be accomplished by having the anesthetist exhale into the breathing bag, thus supplying the patient with the necessary carbon dioxide. The apneic patient would also accumulate carbon dioxide, but the associated hypoxia is hazardous to the patient. In the presence of persistent hypotension, it may be necessary to use vasopressors.

The beneficial effects of respiratory stimulants, such as carbon dioxide and many of the analeptics, are debatable. Analeptics, such as N-allylnormorphine and tensilon (N-ethyl-N-(*m*-hydroxyphenyl)-N, N-dimethylammonium bromide) are used for the specific displacement of morphine and curare, thus relief of depression may be expected. Carbon dioxide and most of the other analeptics stimulate the respiratory center and increase the oxygen uptake, but do nothing in relation to displacement or degradation of the drug which is responsible for the acute depression. Following the initial stimulation of the respiratory center, a secondary depression may be expected from the effects of the analeptic which intensifies the initial depression. Carbon dioxide may be used in the postoperative state to initiate hyperventilation in the prevention of atelectasis. In this instance, 100 percent carbon dioxide from a gas hose is administered by a completely open system. In this way, the patient is stimulated to breathe more

deeply and ventilate the lungs with room air. When the therapeutic use of carbon dioxide is carried to excess the accumulated effects of the drug produce a serious respiratory and circulatory depression.

NAUSEA AND VOMITING

Nausea and vomiting, followed by aspiration of vomitus, is an all too frequent cause of anesthetic complications and even death. This condition is most frequently seen during induction of anesthesia, as the patient enters stage II, or during recovery from anesthesia. Inconsiderate and poorly timed moving of the patient, hypoxia, and irritation of the pharynx are also predisposing factors of nausea and vomiting. Avoidance of these factors in conjunction with a smooth, even induction of anesthesia may prevent a high incidence of nausea and vomiting.

CONVULSIONS

Convulsions are a serious neurological complication that may be due to (1) anoxia from any cause, (2) excess carbon dioxide, (3) hypersensitivity to local anesthetic agents, (4) stimulation of motor centers by drugs, such as vinethene and ethyl chloride, (5) ether anesthesia in the presence of excess carbon dioxide and hyperthermia, and (6) pre-existing neurological disease. The basic treatment of this condition is again ventilation and oxygenation of the patient. The anesthetic mixture and dosage must be confirmed and the carbon dioxide absorption chambers must be checked and soda lime renewed if necessary. In the presence of hyperthermia, the patient should also be cooled. Small doses of intravenous thiopental sodium are helpful in controlling the convulsive seizures.

CIRCULATORY COMPLICATIONS

Circulatory complications are intimately connected with respiratory and neurologic complications. Commonly observed phenomena, such as tachycardia, bradycardia, and arrhythmias occur during induction of anesthesia, surgical stimuli, and trauma. We are primarily concerned with abnormal variations in pulse and blood pressure as signs of impending circulatory complications. Hypotension associated with decreased pulse pressure and tachycardia is most commonly a sign of shock or hemorrhage, but may be observed in overdosage with anesthetic agent. Hypotension, with a decreased pulse pressure and a bradycardia may be due to anoxia in deep anesthesia or reflex stimulation following visceral traction. Hypertension with little change in pulse rate is usually due to carbon dioxide accumulation. Hypertension with increased pulse rate, blood pressure, and tachycardia is due to anoxia or a prolonged excitement period. Hypertension with increased pulse pressure and bradycardia is seen in increased intracranial pres-

sure and with anoxia. Cardiac arrest has been mentioned earlier and further discussion is beyond the scope of this article. Treatment of these circulatory disturbances is directed at oxygenation of the patient, removal of accumulated carbon dioxide, treatment for shock or blood loss, and the handling of anesthesia overdosage in the manner indicated.

SUMMARY

A survey of the more commonly observed "complications" of anesthesia, and their management, indicates that the importance of early correction of minor disturbances to prevent more serious or fatal complications cannot be too strongly emphasized. A thorough knowledge of the patient's deviations from normal physiology and of the pharmacology of the agents used, will enable the acute situation to be met immediately with courage, alertness, and a plan for effective treatment.

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THE MECHANICS OF MEDICAL MEETINGS

WARNER F. BOWERS, *Colonel, MC, USA*

THE IMPORTANCE of developing the ability to speak clearly, accurately, and convincingly in public should be emphasized in our residency training program. Also, we should teach our residents the mechanics of preparing and conducting a medical meeting. Many of the young men will go out as chiefs of services in smaller hospitals where they will be required to arrange and present their share of the hospital staff meetings. Sometimes they may be requested to arrange a program for the local civilian medical society, or to conduct a short course for medical officers. It is a great source of satisfaction to them and to their audiences if they do these things smoothly and well. The importance of this matter seems to indicate that a short discussion might be worth while.

PLANNING THE PROGRAM

In general, there are five styles or types of program which can be chosen, each having its specific good points and shortcomings. The type should fit the needs of the occasion, and it is well to vary the approach from time to time to avoid monotony.

One speaker. The simplest program consists of one speaker who delivers a talk on some specific subject. This type of program is excellent provided the speaker is skillful, the subject is of general interest, and the material is not too voluminous to condense. Usually, a speaker cannot hold his audience much longer than 90 minutes, and actually 45 minutes should be the ordinary maximum. However, there are speakers who can hold a large group for three hours without restlessness. The inherent dangers are that the speaker may be a poor one, and it is almost impossible to find a subject of sufficiently wide interest to hold the attention of a mixed audience such as in a hospital staff meeting where various specialties are represented.

Several speakers. These pitfalls may be avoided by a program made up of more than one speaker discussing unrelated subjects. Here again, the time limitations for maximum length are the same. The minimum length must be determined by the material and the speaker's ability, it being realized that it is easier to ramble for 20 minutes than to say it all and sit down in half that time. A good example of such a meeting is a program put on by a group

From Brooke Army Hospital, Fort Sam Houston, Tex.

interested in clinical research, each outlining his project and giving its current status in seven or eight minutes. An excellent medium with wide adaptability is the *symposium* where some general theme or subject is given broad coverage by a group of speakers, each discussing the subject from his particular viewpoint. An example would be a symposium on duodenal ulcer with the psychiatrist discussing psychosomatic elements, the gastroenterologist presenting aspects of diagnosis and medical regimen, the radiologist giving roentgenographic findings, and the surgeon discussing indications for operation, technic, and follow-up results.

The panel discussion. The fourth mechanism is the panel discussion which often is poorly done because the essential difference between a symposium and a panel is overlooked. The panel should be composed of authorities with diverse viewpoints or representing different specialties. One technic is to have each give some short, prepared remarks to orient the audience, then to ask for questions from the floor. The usual failure is to permit the panel members to use most of the available time in their opening remarks so that almost no time is left for audience participation. This in effect becomes a symposium rather than a panel. Probably the success of a panel rests in large part on the moderator. He can eliminate the opening remarks to good advantage, starting off directly with previously prepared questions designed to include the various panel members, to open up fruitful avenues for discussion, and to stimulate the interest of the audience. If properly done, there will be audience questions almost immediately and thus the entire time can be devoted to questions and answers. The moderator must keep things moving, prevent monopolization by one speaker, divert irrelevant material, smooth over points of disagreement, and see that answers are as conclusive and informative as possible.

The group discussion. Group discussion differs only in that the audience makes up the panel. This is a difficult technic to use with a strange audience because its success depends partly on an alert and at least partially informed group. It requires a very skillful moderator if one is to avoid disaster. However, even an apathetic or a hostile audience can be managed by the group-discussion method if the moderator can keep his temper and is thoroughly familiar with his subject. The group discussion method is not to be chosen lightly by the novice.

The matter of questions from the floor must be given thought. With one speaker questions will naturally come at the end of the program unless the meeting is extremely informal and the speaker invites interruptions. With the program made up of several short talks on diverse subjects, it is smoother to allow time after each

paper for regulated and pertinent questions. If it is desired to use a final discussion period for questions, care must be taken to group the questions for each speaker and to orient the audience to prevent confusion. This same technic applies to the symposium but with less force because the speakers all are concerned with aspects of the same problem. In the panel and group discussions the problem does not arise because the entire program is a question and answer period; rather, it is important for the moderator to summarize or correlate the material presented and the conclusions reached.

ARRANGING THE SCHEDULE

Proper spacing and allocation of sufficient time to each element of the program is of the greatest importance. Most papers can be presented in 20 minutes but it is risky to schedule a paper every 20 minutes without a short break to allow for introductions, the mechanics of lights and equipment, and most important, time for questions or discussion. In many instances, the discussion provoked by the paper is more valuable than the paper itself. A good plan is to use 20-minute presentations with 10 minutes between papers for the purposes mentioned above. Even with these free periods, it is well to bear in mind that it is difficult for the audience to sit still for a full half day. Especially if there are no question periods, a mid-program break of 10 minutes should be allowed. If there are previously designated discussants, they must be allowed a definite time period to present their remarks, still leaving time for questions from the floor. The moderator has the essential but unpleasant duty of keeping the meeting on a time schedule. Meetings should begin strictly on time, and each speaker should be held to the time limit of which he has been previously informed. Some speakers are so discourteous to those following as to utilize all their allowed time in talking and then they expect an equal amount of time to show their lantern slides. If the moderator permits one speaker to monopolize the time of subsequent speakers, those who follow are perfectly justified in declining to present their material, with the simple statement that there is not sufficient remaining time in order to do justice to the subject. Finally, in an all-day session, sufficient time must be allowed for the audience to go to lunch, taking into account transportation time as well as time for eating. Usually an hour and a half is better than allowing just an hour. If there is to be an after-dinner speaker before resuming the session, time and place for this also must be carefully correlated.

DUTIES OF THE MODERATOR

The most obvious duty of the moderator is the introduction of speakers. Adequate introduction of a speaker is difficult and

has a number of aims. First, it should tell the audience who the speaker is; what he is from the standpoint of titles; where he hails from or where his work was done; and why, from the viewpoint of accomplishments in the field to be discussed, he is fitted to address the audience. Second, it must be sufficiently inclusive so that the speaker is relieved of the supposed necessity for reciting his own merits in order to be sure the audience is properly impressed. Third, it must avoid flattery or too flowery pronouncements which may embarrass the speaker by overstatement or inaccuracy. It is well to be careful of attempts at humor in the introduction of speakers unless they are well known to the moderator and he is sure of his ground. Finally, it is essential that the moderator remember the name of the speaker and that he pronounce it correctly. Some moderators feel called upon to deliver part of the speaker's address for him, or at least summarize his work. This is a reprehensible form of limelight-grabbing.

Almost equally important is the moderator's duty to call time on long-winded speakers in order to keep the meeting on schedule. This has been mentioned previously, and if speakers decline to go on because the moderator has injudiciously allowed previous speakers to monopolize the time, the moderator gets what he deserves.

Managing the discussion period and the discussants is an art learned by practice. Here again, the moderator must be time-conscious and must discourage irrelevance. Often, a discussant wishes to impress the audience by presenting a paper of his own and here the moderator must limit discussion to the paper presented by the speaker. Critical and heated comments sometimes emerge and the moderator has the task of softening such criticism, encouraging humbleness from all concerned. Usually it is possible to give a verbal pat on the back before directing a well-aimed, figurative blow at the speaker or discussant who gets out of line. As a last resort, the moderator might suggest that participants agree to disagree, leaving the audience to make up its collective mind on the basis of material presented. Finally, the moderator should remember to thank the discussors, calling them by name if feasible. He should also thank the speakers, even though the talk has been a poor one, because at least the speaker took the time to attend. The moderator who makes a busybody of himself is a distinct nuisance and a real menace to the speaker. Such a moderator is the one who continually jumps up to adjust the microphone, change the lights, erase the blackboard, pull the shades up and down, or supply missing chalk and pointer. All these matters should be done unobtrusively and before the speaker begins his presentation. After that, interruptions should be kept to a minimum and limited to emergencies.

ADMINISTRATIVE ARRANGEMENTS

Much prior planning and administrative effort goes into the arrangement of a medical meeting. The arrangements to secure a speaker are presupposed but may require much correspondence. After this, the scheduling of the program is necessary before the final notices can be sent out. This includes printing of suitable programs and release of proper notices to the press or organizations concerned. Physical arrangements include provision of a proper place, suitable equipment in the form of teaching aids which actually function and trained operators who can get the lantern slides in right side up. No detail is too small to arrange in advance; a burned-out bulb may stop the meeting cold, or absence of chalk may delay a blackboard lecture.

Sometimes there are multitudinous administrative arrangements if the meeting is to last longer than one day. Sufficient time always must be provided for registration of guests and administrative announcements. Facilities for housing, meals, travel, mail, phone calls, transportation, and entertainment need consideration.

SUMMARY AND CONCLUSIONS

A medical program should be planned according to one of the several styles discussed, choice depending on subject matter, type of audience, and other factors. Arrangement of the actual schedule should provide time for discussants, questions from the floor, a break to relieve the audience of monotony, and meals.

The moderator has a very important assignment in properly introducing the speakers, limiting the time to conform to schedule, directing the discussion, making things run smoothly, and yet keeping the spotlight on the speakers rather than on himself. Proper administrative arrangements plus a well-organized program will ensure success.

MEDICAL MEETING

The Society of Military Ophthalmologists and the Society of Military Otolaryngologists will hold a joint dinner and business meeting at the time of the annual meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago on October 11. All members are invited to attend. Application may be made either to Captain James A. Stokes, MC, USA, Walter Reed Army Hospital, Washington 12, D. C., or to Lieutenant Colonel Frank A. Perri, USAF (MC), 3650 USAF Hospital, Box 485, Sampson Air Force Base, N. Y.

ADDRESS TO GRADUATING CLASS

Army Medical Service Officers Advanced Course,
Brooke Army Medical Center*

GEORGE E. ARMSTRONG, *Major General, MC, USA*

ALTHOUGH one does not leave 30 years of service, associations, and comradeships without regret, I derive comfort from the realization that, as a retired officer of the Regular Army Medical Corps, I remain a member of this great family and in some respects can continue to serve the cause of the Army Medical Service. I must admit, however, that the predominant feeling is that of pride—pride in having participated in the tremendous job that the Army Medical Service has done in the past. The Army Medical Service has not only given an excellent account of itself in providing medical support to the Army in peace and in war, but has grown in size, experience, and stature to where it is better prepared than ever to accomplish its mission.

It is natural that at this point in my career my thoughts are more on the past than on the future. We all enjoy reliving our experiences and can derive value from evaluating our past thoughts and actions. Things look clearer in retrospect when all the trivia are forgotten and only the essence of experience remains. I hope that I will be forgiven if I allow myself to think aloud about some aspects of my tour as Surgeon General of the Army.

All of you are career officers. Most of you are approaching the midpoint of your careers. This is the period where your training and experience reach a more advanced level. It is the point in your career where you attain leadership maturity. This is the stage where you begin to participate more directly and more actively in shaping the course of the Army Medical Service. The direction which the Army Medical Service takes at any time is determined by many factors, but none more important than the leadership given it at every echelon of activity.

I vividly recall the deep sense of responsibility I felt when I was informed that I had been appointed to succeed General Bliss as the Surgeon General of the Army. This sense of re-

*Delivered on 13 May 1955.

From the Office of the Surgeon General, Department of the Army, Washington, D. C. Dr. Armstrong is now at New York University-Bellevue Medical Center, 550 First Ave., New York, N. Y.

sponsibility will not leave me until the day I turn my office over to General Hays, but at no time were there so many thoughts running through my mind so rapidly as at that time. What course was I to set for the service? What were the major problems? What were the important things to be accomplished during the next four years? How should they be accomplished? I had served four years as Deputy Surgeon General and was well acquainted with the workings of the office. I knew that soon I would become involved in day-to-day decisions of vital importance to the Army Medical Service, with little time for the broader approach of outlining a long-term course of action. At the same time I knew that it was essential to set a specific course which would provide background, direction, and meaning to these day-to-day decisions.

The mission of the Army Medical Service has been expressed in many ways but it can be reduced to one basic aim—to provide the American soldier with the best medical care the country can afford. This has been the aim of my predecessors in office; it was my aim; and I am sure it will be the aim of my successors. The Army Medical Service, however, is a very complex mechanism. It has many facets—field medicine, preventive medicine, inpatient care, outpatient care, research, training, supply, administration, and so on. It is dependent on varied and scarce resources—money, materiel, facilities, personnel. It is not a free agent—it is an integral part of the Army and of the medical and allied professions, and its course and operations must be closely correlated and integrated with that of the Army and, to an appreciable extent, with that of civilian medicine.

It is not too difficult to evaluate the mission of our Service in light of the Army strength, deployment, and mission, and therefrom derive a desired course of action. Objectives and policies for every facet of Army Medical Service operation flow normally and naturally from the basic mission and the situation. The problem is to translate the desired goals into realistic programs. Unfortunately, sufficient funds and other means are not, and probably never will be, available to achieve all we desire. The basic problem, therefore, is to keep a proper balance among the numerous activities involved in the accomplishment of the medical mission and the available resources. The best possible medical service is not achieved by advancing training of personnel and neglecting to provide a plant and equipment that will permit full use of this training. Conversely, the most modern plant and equipment will not provide good medical service without an adequately trained staff or corresponding advances in research. However, limitations of resources and many other factors often prohibit parallel development of interdependent elements of the Army Medical Service. This is particularly true during sharp changes in the environmental atmosphere, from peace

to war to demobilization to cold war, et cetera. A proper balance between the various elements and facets of the Army Medical Service can be maintained only by periodically shifting emphasis from one to another so as to keep them in balance. Thus, setting the course for the Army Medical Service at any one time is primarily a matter of determining priorities among the many objectives that contribute to the accomplishment of the medical mission. The determination of priorities must take into consideration the achievements of the past, the most urgent problems of the present, and the probabilities of the future. The course of the Army Medical Service must be a continuous one, influenced but not interrupted by changes in the administration.

I should like to discuss the course set and some of the accomplishments made in the major areas of Army Medical Service operations during the last four years.

FIELD MEDICINE

Readiness for combat operations is the primary objective of the Army; support of the Army in the field therefore must receive the highest continuing priority among Army Medical Service operations. Combat operations in Korea provided an opportunity to test and modify our units, equipment, and doctrine. We tried to correct our mistakes on the spot. In addition, we have had a series of symposia evaluating the Korean experience in retrospect, and are incorporating the lessons learned into our tables of organization and equipment (TOE's), medical training bulletins (TB Meds), and other doctrinal media.

a. Professional advancements in the treatment of casualties were many. Particularly significant were the advances in the use of plasma expanders and in the treatment of patients incurring burns and other trauma. The net advance can be judged from the results—the death rate was the lowest and the recovery rate the highest in the history of the American Army.

b. Surgery was moved closer to the front lines than ever before.

c. The Mobile Army Surgical Hospital (MASH) was fully tested and its use considerably modified.

d. The principle of helicopter evacuation was firmly established.

e. Other facets of Army Medical Service field operations were not overlooked.

(1) The use of assistant battalion surgeons (MSC) in battalion aid stations was re-established and further advanced. (2) A medical intelligence detachment was included (in TOE 8-500) to fulfill the need for the performance of the medical intelligence

functions required by the Medical Service in the field. (3) In 1954 a new veterinary hospital unit was established (as TOE 8-770, combining the capabilities of and replacing the old TOE 8-750 and 8-780). The new unit can care for small animals in support of infantry scout dog platoons and other security units which use small animals. (4) The medical social workers, both enlisted and officer, were written into the table of organization and equipment of hospitals previously furnished medical social

Major General George E. Armstrong, MC, USA, Surgeon General of the Army from 1 June 1951 to 31 May 1955.

work through the facilities of the American Red Cross. (5) All Army Medical Service tables of organization and equipment were reviewed and appropriate enlisted spaces were designated as noncommissioned officer positions to separate noncommissioned officer from specialist within medical TOE. (6) All of the Army Medical Service equipment lists were revised. The latest equipment and supplies have been included. This includes new type field medical treatment equipment, such as operating tables and lamps, dental treatment units, x-ray equipment, and new type medical field chests. Expendable supplies have been revised with a resulting reduction in total quantities carried by any unit.

SUPPLY

I can state with confidence that the Army medical supply system has held a position of leadership over all supply services for a number of years. My objective was to maintain and, if possible, advance this position. I am happy to report that we have not lost ground. Some of the major achievements in the last four years are:

a. The Army stock fund and financial inventory accounting systems have been installed and extended to stations and oversea commands. The stock fund is a working capital fund for the acquisition and distribution of supplies. The Medical Service has been the first service to fully use the stock fund principle and others are now following.

b. Real unification has been achieved in the field of procurement, development, standardization, and industrial mobilization planning for medical materiel. Although these triservice activities began in 1946, the Armed Services Medical Procurement Agency (ASMPA) has made great strides during the past four years. The Hoover Commission has recommended that ASMPA be used by all Federal agencies for procurement of medical items in the same manner as now done for the Federal Civil Defense Administration.

c. For the first time in the history of the Army Medical Service we have a balanced stockpile of medical materiel for a mobilization reserve. It is currently valued at nearly 100 million dollars, and it will greatly lessen the impact of any sudden mobilization.

d. Our operating hospitals have been furnished with standby equipment to fill any immediate expansion requirements. This plan also served to disperse equipment for any emergency. Additionally, a number of inactivated hospitals have had their equipment placed in "mothballs" for the same purposes.

e. We have developed plans and procedures for the supply of whole blood to oversea commands and for a national stockpile of plasma expanders. This program is also on a triservice basis for the Army, Navy, and Air Force.

f. Management procedures have been inaugurated in all medical depots, first, by installation of comptrollership for control purposes, and secondly, by installation of a work progress reporting system and a cost analysis program.

RESEARCH AND DEVELOPMENT

To assure that the best possible medical care is provided our soldiers we must continually conduct research in all aspects

of military medicine. To obtain maximum return from our resources for research we must make full use of the products of civilian research and confine ourselves to the research problems peculiar to the Army. Some very significant advances have been made in the last four years.

a. Research in the repair of damage to major blood vessels reduced the amputation rate during the Korean war to 60 or 70 percent of the rate during World War II. This produced a greatly reduced hospital burden, returned normal instead of handicapped men to their families, and saved millions of dollars in disability pensions.

b. The development of dextran as a substitute for blood plasma afforded the first effective, cheap, and relatively safe plasma expander. Every unit of dextran procured in lieu of human plasma represents an average saving of 20 dollars.

c. The isolation of a group of viruses, of which RI-67 is an example, and which appear responsible for a large portion of acute respiratory disease, is the first significant breakthrough in the study of the etiology of these diseases. The control of this group of diseases would materially reduce the time lost by recruits during basic training.

d. The development of methadone hydrochloride as a synthetic substitute for morphine has relieved the United States of dependence on uncertain foreign imports of opium for the manufacture of morphine.

e. Primaquine is the first curative drug which has been found for the type of malaria most commonly encountered in our troops in overseas areas. This agent almost eliminates the danger from carriers of malaria among returning troops. It reduces military hospitalization time and protects our civilian population.

f. A successful prototype model of a portable x-ray unit, weighing 40 pounds, that will provide roentgenograms in the field in less than five minutes has been developed. Using the radioisotope thulium-170 as a source, the unit will provide radiology service in forward combat areas, where such service was not previously available, for diagnosis of fractures and location of retained foreign bodies.

g. A new field-type dental engine has been developed which weighs 1½ pounds, and can be operated off any vehicular battery, as compared to the present standard engine of about 40 pounds which requires a generator for operation. This new engine has a speed of 10,000 r. p. m. (versus the 2,500 r. p. m. of the present item), which increases the cutting efficiency of instruments, decreases the patient's discomfort, and saves the operator's time.

TRAINING

The hub of the Medical Service is the professional and technical proficiency of its personnel.

a. The internship and residency programs for medical and dental officers serve a triple purpose. They constitute the most successful method for procuring officers for the Regular Army Medical and Dental Corps, provide the varied specialists essential to modern medical care, and raise the standard of medical service provided to our patients. The amount of internship and residency training given must of course be kept in line with the needs of the Army and with the facilities and teaching material available. The training program in our own hospitals has now been developed to a point where, except for a few selected specialties, we have been able to eliminate our internship and residency training programs in civilian hospitals. The standard of our training program has been praised highly by the civilian leaders of the profession. The high teaching standards maintained in our hospitals are reflected in a flood of applications for internships and residencies. This enables us to select the best of the graduates from medical schools. The professional advancement of the Medical Corps can be judged from the following figures:

(1) The number of board-certified medical officers increased from 266 in June of 1951 to 429 as of 30 April 1954. (2) Sixty-six percent of the Regular Army Medical Corps officers are currently board-certified or board-qualified. (3) Another 18 percent are currently in residency training, bringing the total of those board-certified, or board-qualified, or those in training for board qualification, to 84 percent of the Corps. (This is based on primary military occupational specialty (MOS) and may even be higher if we take into consideration secondary MOS data.)

b. Important as is professional training, we must never lose sight of our basic mission, which is preparing our officers for staff and command responsibilities. This is particularly important as we lose officers with World War II and Korea experience and replace them with younger graduates. We have, therefore, placed continuing emphasis on staff and command training, as you in this class are fully aware.

c. Training is a continual process. All aspects of professional and military training are therefore promoted and encouraged through hospital training programs and school courses. As examples of this type of training, the course in surgery in acute trauma conducted in all class II hospitals received wide and enthusiastic acceptance. A course which brought military medicine up to the atomic age, and therefore of particular signifi-

cance, is the one on medical care of mass casualties offered at the Army Medical Service Graduate School.

d. We have not lost sight of the long-range needs of the Army. A triservice medical scholarship plan has been developed and proposed to Congress to ensure availability of doctors and dentists for the Army in the future.

e. In view of the expansion of aviation activities in the Army we are training Medical Corps officers as aviation medical examiners. Also, Army Medical Service officers already qualified as helicopter pilots are being trained in certain aspects of helicopter casualty handling.

f. The clinical technician has proved his rightful place in the Medical Service family. We have expanded the clinical technician's course to Letterman and Fitzsimons Army hospitals and are now graduating about 300 clinical technicians a year.

g. The Medical Education in National Defense (MEND) program was introduced into five medical schools at the beginning of the 1952-1953 academic year. The program, designed to provide instruction in civil defense and military medicine, is integrated into the regular medical curricula for all students.

h. During the fiscal year 1954 the medical and dental ROTC programs were discontinued as uneconomical and unproductive. It was recognized that the cessation of medical ROTC summer camps would decrease Army relations with medical college students, and a substitute program was developed. The clinical clerkship program was introduced to fill this need. This program provides an opportunity for medical college students between their third and fourth years to be employed for 6 weeks at a U. S. Army hospital at a monthly stipend of 183 dollars. Each student clerk is matched with an intern at the medical installation and has an opportunity to become familiar with medicine as practiced in Army hospitals. This medium provides for continuing good relations with medical colleges and medical students, and operates as a procurement device for the Regular Army Medical Corps.

i. In line with our basic mission, high priority has continually been placed on all aspects of field training. The Surgeon General was made responsible for the conduct of logistic exercise 1955 (LOGEX-55). I designated the Commandant, Medical Field Service School, as maneuver director for this exercise. A number of Army Medical Service officers were assigned to the staff of the maneuver director for LOGEX-54 to gain experience for this task.

j. Professional and technical proficiency alone are not sufficient to produce the best in medical care. Interpersonal relationships play an important role in the care of patients. A pamphlet

entitled "Interpersonal Relationships in the Care and Management of Patients" was developed which contained material for 4 hours of formal instruction emphasizing that courtesy, consideration, a sympathetic approach, and the golden rule are the keys to the problem of successful interpersonal relationships.

k. During the past 2 years we have introduced into our schools some 15 new courses. Embracing the entire range of military medicine, and designed to meet the needs of both officer and enlisted personnel, these courses illustrate the aggressiveness with which the Army Medical Service has attacked the problem of improving its professional, technical, and military training.

MANPOWER CONTROL

The best-trained personnel are of little use unless they are in the right place at the right time. The Surgeon General has had control over the distribution of his professional personnel for a good number of years. I continued the policy of making professional personnel assignments on an individual basis, giving full consideration to each officer's career pattern and personal desires as well as to the needs of the service. The most important advance in personnel management during the last 4 years has been with regard to medical enlisted personnel. The two gains most worthy of note are:

a. Creation of Medical Records Specialist (MOS 1305). This enables the retention in the medical service of personnel trained and experienced in medical records, reports, and statistics.

b. Development of close co-ordination with major commands in the assignment of key medical enlisted personnel. A proposal to establish Army-wide centralized assignment control of senior noncommissioned officers, including those in the medical service, is under consideration by the general staff.

MANAGEMENT

You have heard about, and many of you have had experience with, the large variety of management programs introduced in the Army in the last few years. We have made full use of these ideas, improving them and adapting them to the needs of the Army Medical Service, which is a large and costly enterprise. I believe that management of this enterprise must keep pace with its growth and development. Every dollar and every person saved in one area can be fully used in another to improve and advance the Medical Service.

a. I have already mentioned the Army stock fund and financial inventory accounting in relation to the medical supply system. We have been testing the industrial fund, integrated accounting, and some other programs at Valley Forge and other hospitals,

and are slowly but steadily advancing in our plan to extend the financial management program to the entire Army Medical Service.

b. I am proud to report that we were the first technical service to extend the Department of the Army Primary Program System, both at headquarters level and in the field. The Army Medical Service Program Document has now been in existence for over a year and represents in writing the complete and co-ordinated programs governing all facets of operation of the Army Medical Service. Much is left to be done to complete the change-over from our old system of controlling and directing Army Medical Service operations to the Program System, but more than a start in that direction has been accomplished.

c. I am also proud to report that we had introduced many aspects of management engineering in the Army Medical Service long before the term was accepted as a byword in the Army. It has been used successfully in supply management and hospital operations for a number of years. It has now been extended and expanded throughout all elements of the Army Medical Service. Perhaps the most noteworthy accomplishments have been:

(1) The development and improvement of standard organizational structures for both Class II and Class I hospitals. (2) The development of doctrine and methods of reducing hospitalization loads through the treatment of patients on a clinical basis. (3) The successful experiments in centralized ward food service. (4) The development of guidance for use of clinical technicians. (5) The development of standards and factors for personnel staffing. (6) The introduction of modern business machines and devices into our installations and activities.

PLANT

The weakest link in our long chain of activities and resources at the time I took office was the condition of our plant. During World War II, hospital facilities, having been built on a temporary basis, deteriorated rapidly. However, as long as facilities were available and funds were tight, replacement of these facilities was not permitted in the Army. The Korean situation created a need for hospital beds and other facilities at a number of posts. A plan to meet this need through construction of permanent hospitals was developed but repeatedly met with obstacles. I made it a matter of the highest priority to put this plan into effect. We were finally successful in convincing The Army Staff, The Department of Defense, The Bureau of the Budget, and Congress that it was in the interests of economy and good medical care to begin replacing outworn facilities with permanent structures. The situation at present is somewhat as follows:

a. Hospitals at Fort Knox and Fort Belvoir are under construction. Hospitals at Fort Bragg, Fort Benning, Fort Monmouth, and

Fort Riley are scheduled to be under contract by the end of this fiscal year.

b. Construction of a hospital at Fort Dix has been approved and will most probably be initiated next fiscal year.

c. The Armed Forces Institute of Pathology is now housed in a new modern building at the Walter Reed Army Medical Center.

d. Many new facilities to meet various needs, such as nurses' quarters, barrack buildings, laboratories, holding facilities for animals, and medical warehouses have been or are being constructed at many of our installations and activities.

e. It is realized that so huge a replacement program as is required cannot be completed in a few years. In the meantime, we must continue to operate in many temporary buildings which have seen considerable wear. An additional problem has been created by the fact that the sharp drop in the hospitalization rate, combined with the contraction of Army strength, has reduced patient loads far below the original capacity of any of our hospitals. This means scattered operation. At the same time, the increase in dependent care has made many of our obstetrical facilities inadequate. To the extent that funds could be made available, rehabilitation of facilities to meet the most immediate needs and to consolidate operations has been carried out in many of the hospitals.

HOSPITAL OPERATION

I have left hospital operations for last because it is the recipient of, and in itself embodies, the advancements in supply, training, manpower control, management, plant, and other facets of our activities. The advances made in hospital operations can be summed up in two figures. The hospitalization rate—that is, the number of beds occupied per 100 troop strength—has decreased from over 2 percent in 1951 to 1.1 percent at this time.

RELATIONS WITH OTHER AGENCIES

I must not forget to mention one very important advancement during the last four years. The Army Medical Service has many special and unique problems. Procurement of medical professional personnel is perhaps the most acute of Army procurement problems. The health of the Army depends on close integration of preventive and therapeutic medical activities throughout all echelons of command. For example, the hospital system to be effective must be operated as a totally integrated system. To an appreciable extent the operation of the Army Medical Service must be closely co-ordinated with parallel services of the Air Force and Navy, with other Federal services, and with civilian medicine. This takes administrative shape in the segregation of medical problems from other problems at practically every

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echelon of Government—Assistant Secretary for Health and Medical at Department of Defense level, Medical Branch at the Bureau of the Budget level, separate representation at Presidential level (Doctor Rusk), separate consideration at Board and Commission level (such as the Hoover Commission), and so on. All of this often results in dealing with Army Medical Service problems within the Army as an exception and deviation from normal Army staff and command relationships. Although these factors are fully recognized by all concerned, they could readily precipitate what might be called relations problems. As I have mentioned previously, the successful accomplishment of the medical mission depends on close co-ordination and cooperation between all elements with an interest in the Army Medical Service. I have been very conscious of this fact throughout my tour as Surgeon General of the Army. I am happy to report that relations between the Army Medical Service, Army Staff, the Office of the Secretary of Defense, the Bureau of the Budget, higher governmental bodies, and civilian medicine have never been better than at present. We are truly working together. We may have differences of opinion at times, but we have all learned that our end goal is the same and that we can and should find a mutually acceptable course.

CONCLUSION

To have rendered an account of my stewardship to this group here seems to me particularly appropriate. As of today you officers will begin to assume an increasingly important role in establishing the future course of the Army Medical Service. By the same token, you will be charged with the responsibility for maintaining that course.

The advances made during my tenure as Surgeon General should not be attributed to me, nor would it be proper for anyone to infer that their accomplishment was due solely to my stimulation. To repeat once more a thought that has been expressed in one way or another many times: The progress of the Army Medical Service is a continuing process, in which past accomplishments inspire us to the solution of present problems; in which we must avoid the mistake of living in the present; and in which we must anticipate tomorrow's problems with an overwhelming confidence in our ability to furnish tomorrow's solutions. It is my fondest hope that I may have aided in accelerating that process. The happy circumstance of striding forward in seven league boots has not always been our lot, but we have consistently fought to shear off the leg irons of stagnation.

Four years ago I was named captain of a strong, well-conditioned, winning team, a great honor indeed. But surpassing even that is the honor and pleasure that has been mine in being a member of this wonderful family of ours for the past 30 years.

THE BATTALION SURGEON

DOUGLAS LINDSEY, *Lieutenant Colonel, MC, USA*

THE TASK of battalion surgeon is one of the most important and, at the same time, least understood in the medical service. Of all medical officers, the battalion surgeon is the most appreciated by his prospective patients. The duty is least appreciated by the prospective incumbents.

Certainly the position is surrounded by more confusion and contradiction than any other medical officer position that I know of. The confusion is both amusing and alarming. In a short span of time you can hear such conversational mirror images as these:

We need the best men in the forward medical installations.

We can't use him for anything else; send him to a division.

We need two Medical Corps officers in the battalion.

A professional officer is wasted on battalion duty.

The battalion surgeon is the key officer in the field medical service.

We can dispense with the battalion surgeon more readily than any other Medical Corps position.

The battalion surgeon must have good surgical judgment.

The battalion surgeon is limited to the performance of first aid.

As a battalion commander I couldn't do without my Doc.

No need to call the Surgeon; he is not concerned with this plan.

Most of the conflicting opinions which I would place on the erroneous side of the table appear to come from those who know the least about the job. They are from people who have never been a battalion surgeon, or have never seen a good battalion surgeon work. Some of the opinions which are sweeping assumptions pertaining to professional functions are offered by those without professional background. But there are some flagrant exceptions. Even the battalion surgeons themselves may differ:

I don't like the living conditions, I don't like being shot at, and I surely would like to be in the operating room again, but I can't think of a place where I could *do* more good.

I'm wasting my time here.

From Brooke Army Medical Center, Fort Sam Houston, Tex.

I have observed some battalion surgeons who completed their combat tour and rotated without ever having learned what their duties were.

Frankly, I am at a loss to explain why the uncertainty and the inconsistency exists. When I went to my first assignment as a battalion surgeon I knew pretty well what to expect. I had been told about it at the Medical Field Service School. My expectations were realized. Through four succeeding battalions (two in the states, and two overseas) I learned a little more each time about *how* to perform the duties of the position, but I never got any indication that my basic conception of the position was wrong.

My own days as a battalion surgeon were ended after World War II. But during the war in Korea I was fortunate enough to have duty that permitted me to spend a considerable amount of time in and around aid stations. Because battalion surgeons rotated more frequently than did staff officers in rear headquarters I had the privilege of talking to battalion surgeons numbering in the hundreds. I still have essentially the same concept of the battalion surgeon that was presented to me in my own initial training. The only change is that the job has gotten bigger, matching the increasing complexity of modern medical science and modern warfare.

Today it appears that too few people have this same picture.

When did the basic concept change? Or has it changed at all?

Who is interested in promoting a depreciation of the importance of the battalion surgeon? Or is there anyone interested in doing so?

And when did the Medical Field Service School start teaching a doctrine different from the one they taught me? They did not. The teaching is the same today.

Yet we are hearing a great deal more about the limitations of the battalion surgeon's job.

If too few people understand clearly what the battalion surgeon is actually supposed to do then it may be worth while to review his duties.

The battalion surgeon is responsible to his commander for the treatment of casualties on the battlefield by aidmen he has trained—and their collection and evacuation to the aid station, by litter bearers under his control.

He treats and returns to duty those casualties whose wounds are amenable to definitive treatment in the forward area.

He initiates the professional medical treatment of those who must be evacuated to the rear, and evacuates them in the best possible clinical condition.

He is the medical advisor to his commander.

He is the physician for a community of a thousand men living in a primitive environment and engaged in a hazardous occupation.

He commands the medical detachment of the battalion, trains it, and directs its employment.

This is nothing new to anyone. But it seems that it is not alone enough to spell out the scope of the responsibility and the degree of importance of the task.

All in all, the job of the battalion surgeon is to conserve the fighting strength of the battalion. This may be the clue. The *less* serious the wound, the greater the potential for salvaging a fighting soldier, but the more subtle and more intricate the medical decisions involved. The more serious the wound, the more evident the diagnosis and the clearer the basic plan of treatment, but the more important are the touch-and-go quick decisions and little modifications of treatment that make the difference between saving and losing a human life.

Here are my own ideas on "who is the battalion surgeon?" and "what does he do?".

KEYSTONE OF THE FIELD MEDICAL SERVICE

The battalion surgeon is the least dispensable person in the medical service. Yet, if we lost him, the loss would not be readily evident in the popular statistical measures of medical service. More patients would die before reaching hospitals, and fewer would die in hospitals. Too many of us have forgotten that the hospital receives only those patients who have been successfully treated by the battalion surgeon. The patient who dies in the aid station, or forward of the aid station, does not appear on the mortality rolls of the surgical hospital. But every patient who dies in the hospital represents first of all the success of the battalion surgeon (albeit often temporary or partial success), and the failure of the hospital. On this matter I quote Brigadier General L. Holmes Ginn, Jr., a good physician who has devoted his career to field medical service: "It is very seldom that a life is saved in the rear of the battalion area" and "The life lost in the battalion aid station is never restored in the elaborate hospitals in the zone of the interior."

More than any other medical officer, the battalion surgeon can influence the course of battle by returning selected wounded men to duty. A good battalion surgeon can treat and return to duty

from the battalion aid station some 30 percent or more of the wounded. This is not a theoretical textbook figure. It represents the average aid station WIA return to duty rate of selected field units who were known for their good medical service. This result is not automatically attainable. In some divisions and battalions it has been as low as two percent. In these units the other 28 percent usually gets returned to duty sooner or later. But a trip to the regiment and back takes a day, or not less than half a day. A trip to the clearing station and return measures several days. And this time is lost at the moment it is the most valuable—at the height of the battle. The squad or platoon needs its replacements now, not tomorrow night or next week when it is in reserve. The battalion surgeon can furnish one third of the replacements it requires. Best of all, he can furnish *trained* replacements, who will not be faced with the problem of integrating their individual skills with the function of the team. Each man fills his own vacancy.

Besides the immediate salvage of one third of the battle wounded, the battalion surgeon can return to duty from the aid station one half to two thirds of the neuropsychiatric casualties.

The man who can perform these feats is indispensable to the medical service. But isn't this an easy task? Couldn't this be done well enough by technical or subprofessional personnel? The answer is no. Surely we do not wish to leave the decisions in the treatment of neuropsychiatric patients to a technician, or to aggravate or fix an otherwise transient and reversible neurosis by changing to an arrangement that requires evacuation of all these patients to the rear. For the wounded the answer is more definite but perhaps less evident. The application of a splint to an obviously shattered extremity is a job that can appropriately be delegated to a trained layman. The decision as to whether a 3-mm. laceration above the nipple can be dismissed with a band aid, a tetanus shot, a Purple Heart, and reassurance, or whether it means a chest tap and a call for a helicopter, can legally and ethically be made only by a physician. Beyond rules and codes the decision can be arrived at only on the basis of professional training and experience.

DUTY IS PROFESSIONAL

The first time that I heard the pronouncement that the battalion surgeon practices only "first aid" I was sympathetically embarrassed for the speaker's ignorance. As I heard it more and more I became mildly irked. Now I openly rebel.

As I recall it, I had a pretty good working knowledge of "first aid" between the ages of 12 and 22. But when, as a junior medical student, I put on a white coat and took a job in the emergency

room of a small private hospital to spread my budget with free meals of red beans and rice, I began to learn something that was entirely different. Since the time I finished medical school I have administered little first aid, but I have practiced a good bit of traumatic surgery under field conditions. Is a tracheotomy "first aid," even if it is done with an unsterile scalpel under the headlights of a jeep? It *has* been done by an aidman, but is this the rule or a distinctly unusual exception? When a patient walks into the aid station complaining of pain in the left shoulder after a truck accident is it "first aid" when you diagnose a ruptured spleen? And we may even consider the less dramatic cases. I recall one instance of a simple foreign body in the eye. We were on a troop train. A patient was referred to an aid station located in the coach carrying the medical detachment and battalion headquarters of an infantry battalion. The battalion surgeon instilled tetracaine hydrochloride. He sharpened a toothpick into a flat spud, dipped it in alcohol, and let it dry. He used it to spud out all the fragments of a cinder which was well embedded in the cornea. He bandaged the eye, and followed the patient closely for several days.

Was this "first aid"? Read the *Field Manual* 21-11, *Training Manual* 8-230, and the American Red Cross' *First Aid in Illness and Injury*. What would have been the procedure of first aid for the handling of an embedded foreign body? The train would be stopped at the next station. The patient would be put off and sent to a hospital. Days would pass before he would catch up with the unit. And that particular patient happened to be the division surgeon!

Anyone who holds that the battalion surgeon can only administer "first aid" has a bizarre definition of the term. Or if his understanding of first aid is correct, and he really means to say that professional talent is not utilized in the aid station, I can only guess that he has never been a battalion surgeon. Occasionally I have heard a battalion surgeon complain legitimately that his professional talents were wasted, but he actually meant his specialty talents. The strongest example of this that I have seen was the board-certified ophthalmologist who somehow wound up in a battalion aid station near the end of the war in Korea.

As I have mentioned, there are a few battalion surgeons who will complain that their basic medical professional talents are not required. The few times I have heard this it was from surgeons of battalions who had been long in reserve, or on line on a very quiet front. And in each instance I think that the division surgeon failed in one of his most important duties—that of selecting for battalion surgeons men of initiative, judgment, and, if possible, experience in the surgery of trauma. Certainly the division and

regimental surgeons concerned failed in their duty to train and supervise the battalion surgeons under them.

I often think back to the exemplary actions of three officers who were the very best all-around battalion surgeons I have ever known. After I had seen them work in their aid stations I became interested enough in their backgrounds to look up their records. One had had three years of formal training in obstetrics before he went to an aid station; one was a research internist; and one was board-eligible in surgery, and asked for aid station duty pending a vacancy in a surgical hospital. If the job of the battalion surgeon is "first aid" it is strange that it takes a highly skilled professional officer to do it really well.

BASIC DUTY IS SURGICAL

In peacetime, and, to a lesser extent when the battalion is in reserve status in the combat zone, the professional function of the battalion surgeon is comparable to that of general practice. But it is a basic premise that the function of a military unit is to fight, or to be so well prepared to fight that a potential enemy knows that he will be beaten, and consequently does not force an issue.

In combat the battalion surgeon is engaged in the management of patients who have sustained formidable trauma. The photographs of a battalion aid station in action bear virtually no resemblance to a surgical amphitheater, or even to a hospital emergency room. But the patients and procedures are surgical. Certainly the aid station bears even less resemblance to the medical clinic, the obstetrics ward, or the waiting room of the family physician.

HE IS NOT PROFESSIONALLY LIMITED

The system of "echelons" of maintenance within the army is not based on *how much* or *what type* of work is done at each echelon, but primarily on *who* does it.

In the starkly simple words of the manual, the battalion surgeon is supposed to initiate the professional treatment of the casualty, and prepare him for evacuation. These are pregnant words. Before the casualty is ready for evacuation, everything must be done for him that is necessary to be done to insure that he is prepared to survive the trip to the rear, and will arrive at the rear medical installation in fit condition to withstand the treatment procedures which will be carried out there. It is unfortunate that the writers of the manual saw fit to use the word "restricted" to put over their point that the most frequently performed procedures in the aid station are designed for the control of hemorrhage, the immobilization of fractures, and the treatment of wound shock; (FM 8-10 par 63 b (3)).

These are not easy things to accomplish, particularly the broadly inclusive problem of the management of shock. They may require some heroic or delicate, though not elaborate, surgical procedures. The battalion surgeon may do venipunctures or cut-downs on all four extremities in order to infuse blood and plasma expanders at a life-saving rate. He may cannulate the femoral vein. He may risk removing a tourniquet in order to effect better hemostasis by clamping or ligation. He may have to make successive chest taps in order to judge whether a patient can survive evacuation without bleeding to death into his pleural cavity. He will do tracheotomies—to insure adequate respiratory exchange in a patient with cerebral trauma; to establish an airway in a patient with a neck wound; to permit packing of a bleeding oropharyngeal wound; or even just to make repeated tracheobronchial suction more dependable.

The only real limiting factors in the extent of treatment at *any* medical installation are the professional ability of the medical officer, his equipment, and the implications of the tactical situation.

Whatever must be done to ensure the life of the patient during subsequent evacuation, that the battalion surgeon must do if it is within his professional ability and the equipment he has at hand. And he has good equipment. I have been on emergency room duty in university hospitals and major military hospitals. With a very few exceptions I believe that the battalion surgeon has equipment just as adequate. He has tubes and catheters; oxygen and lights; sterilizer and splints; otoscope and ophthalmoscope; and needles, syringes, clamps, and sutures. For suction he will have to use the ear syringe with a catheter, or requisition an asepto-type syringe, or rig up the windshield wiper vacuum line of the jeep. If I were going back to duty as a battalion surgeon I would take my own personal stethoscope, whose ear pieces have been worn to fit me, and my own personal head mirror and laryngeal mirror. And I would immediately requisition some favorite medications and minor items of expendable equipment. This latter is something many medical officers do not realize. If they need a 3-way stopcock they do not have to wait several years for a recommended change in table of equipment to be processed. The item is in the catalog; it is expendable; it can be requisitioned.

HE IS NEEDED IN PEACE OR WAR

The battalion medical detachment has a professional mission. It cannot prepare for that mission without professional guidance. This is a basic requirement, but there are others that point to the need for the battalion medical officer in the unit in general reserve as well as the unit in combat.

Military men readily agree that a unit cannot be considered as an efficient functional entity simply because every person in it is qualified in his own job. Beyond even the best individual training there is an essential period of training together as a team. This means the team of the medical detachment itself, functioning in full capacity in primary care of the sick and injured of the battalion in garrison and on field exercises. And it means training the whole battalion as a team which is accustomed to working with and being supported by its own medical detachment.

The training of individual technicians requires a medical officer "in residence" in the detachment. There is *no school* for the training of field medical aidmen. From the time that the private completes 16 weeks of basic training until he retires as a master sergeant, the medical soldier in the military occupational specialty of chief medical aidman must be trained and developed on-the-job. We cannot develop good technical assistants unless we have professional men to guide them.

And finally, but not the least important, is the fact that we must give our career medical officers some practical experience in this key position. Experience in a battalion aid station is not essential to a hospital administrator, but it certainly is of value to a corps or army surgeon.

NOT BURDENED WITH ADMINISTRATION

Besides recollection of my own experience and direct observation of medical detachment operations, I have had occasion to survey medical detachments to determine the workload actually involved in their command and administration.

The figures have ranged from 4 to 44 hours per week. The 44-hour figure came from an administrative officer who was by default commanding a detachment of a general reserve unit which had no medical officer assigned. I can appreciate his obvious dilemma. It would be difficult for him to admit that part of his week was idle time. Yet another officer, in a similar position, frankly admitted that 15 hours a week was all the profitable employment he could find.

From medical officers without an administrative assistant the consensus was 10-14 hours per week. This is a little time in the morning and a little time in the afternoon to clear away the administrative business of the day, and a couple of hours for the Saturday morning inspection.

All these figures are for garrison, of course, because in combat the administration melts down and is absorbed into the basic process of technical operations in a tactical environment.

Whenever a battalion surgeon claims that more than 14 hours a week are expended on command and administration of a medical detachment by himself alone or in combination with another officer the situation is worth a critical look. It is probable that an officer is doing the work of sergeants and corporals. I know we must face the fact that we do not have the type of noncommissioned officer we had in the "good old days," but the answer is that it costs relatively little time to train a raw noncommissioned officer by giving him a job and, in painstaking detail if necessary, seeing that he gets it done. It costs a great deal of time to keep doing it for him over and over.

The battalion surgeon has to spend a significant amount of time on functions that may be new to him, but which are inherent in his position as a commissioned officer and an officer of the Medical Corps, and which are not based on the fact that he commands the detachment. He must train his technicians in their technical duties. This is his function as a physician. Who else can do it? He must sit on or be a witness before boards involved in ridding the service of noneffective personnel. Who else can see that justice is done for a man who is mentally or physically incapable of performing military service? Who else can offer the medical advice to protect the interests of the government against those who use unfounded medical complaints as a basis for nonperformance of duty?

Like every other officer in the division, regardless of branch of service, he must participate in training in the responsibilities of a commissioned officer and in the skills essential to survival in battle.

The battalion surgeon can and should train his detachment. He can command and administer it. And he still has time to provide primary professional medical care to the battalion. In garrison he has time for conscientious and thorough dispensary service. And he still has time to read in the medical library and attend rounds and staff conferences at the station hospital. Even with all this he probably will not be working the long hours that he accepts as normal in a residency or in private practice.

In actuality very few officers in the Army are employed solely in the command of men. They are in command of units which have a specific tactical or technical mission to perform. A tank company does not rate a captain to command 100 men. The captain is there to direct and control several tank platoons in battle. The administration of his company and his 100 men is only a small part of preparing them to fight and commanding them on the battlefield. The captain does not rate an executive officer as an assistant in administration. The observation has been

made time and time again that an executive who devotes his primary attention to housekeeping is not helping his commander shoulder the load.

Similarly the command and administration of a medical detachment is no great burden. It is a minor part of preparing the unit to give medical service to a battalion in action and in keeping that medical service running smoothly when the pay-off comes.

DUTIES RELATED TO TACTICAL ACTION

This relation is sometimes obvious and straightforward, sometimes subtle and indirect.

An aid station location which is "ideal" in all other textbook requirements is not ideal or even satisfactory unless it is so related to the tactical operations of the companies that it actually provides them with effective medical support. Medical service is not automatic. It cannot be stockpiled and requisitioned. It cannot be delivered "on call." It must be planned, and the planning must be continuous in order to keep the medical support up-to-date in a constantly changing situation.

The battalion surgeon must be a bona fide member of the battalion. He cannot be a transient visitor, or a civilian consultant under contract. Unless he feels that he belongs to the group he serves, he will not endure the hardships and danger and expend the extra effort that the best service to them requires.

JUDGMENT DEMANDED

We have much to learn from the medical service of the Marines. They have two medical officers in the infantry battalion, and they use them well. I have never heard the junior of the two complain that he was not needed, or that his duties were administrative. Most of the company grade medical officers are given experience in aid stations before they go back to positions in the medical battalion.

The reason I bring up the Marines is to quote their teaching on judgment: The battalion surgeon "must retain coolness and calmness and must show a near perfection of surgical judgment under the most adverse conditions. Surgical judgment is that indefinable but essential attribute compiled of just the right mixture of a stable nervous system, past surgical experience, common sense, and an ever-ready diagnostic ability. It seems the needless sacrifice; but wars are won by sending the best men to the front, for only the best possess the essential qualities necessary to ensure victory."[1] Like the legendary criterion of the good army mule (a kindly look in the eye) surgical judgment is difficult to describe but easy to discern.

The battalion surgeon is faced with the necessity of making surgical decisions in major traumatic cases with a rapidity and frequency that is never seen in private surgical practice. But some of his most difficult decisions are the smaller ones. I recall the case of a lieutenant who twisted his ankle when he stepped in a hole in the dark. The ankle was badly swollen and painful. In civil practice the first step would have been to have a roentgenogram made, but in this instance it would have required at least 6 hours of the officer's time. And this officer was needed in less than an hour to adjust and control the mortar preparation preceding an important attack. The judgment of the battalion surgeon was for sprain, and not fracture; and for initial treatment by strapping instead of cast. The officer was delivered to his observation post by litter jeep, minus a boot, and plus an adhesive plaster splint. He fulfilled his mission.

Can we pass the responsibility for such decisions to a man trained in "first aid"? Or can we even pass such responsibility to one of our less experienced or less decisive physicians?

In summary the battalion surgeon is the most important man in the field medical service. He must be the best professional man and the best medical soldier of the medical officers we have available.

REFERENCE

1. Conn, H. R.: *The Battalion Medical Officer.* Lecture delivered to the Field Medical Service School, Camp Lejeune, N. C.

PENALTY FOR POOR PENMANSHIP

Druggists and the examiners of the Royal College of Obstetricians and Gynaecologists are taking steps to make British physicians improve their handwriting, according to the *London Daily Express.* Tired of the traditionally illegible penmanship of doctors, the examiners say that physicians who seek diplomas will lose marks for bad handwriting. Examiners now make it a point of professional honor to avoid penalizing applicants for poor penmanship.

"The pharmacists complained that physicians' prescriptions, as a rule, were so difficult to read that dangerous dispensing mistakes easily could be made," the paper stated.

—From *GP*, p. 133, Sept. 1953

CASE REPORTS

Fulminating Meningococcemia and Meningitis With Vascular Collapse

Report of a Case of Waterhouse-Friderichsen Syndrome With Recovery

SANTINO J. LERRO, *Colonel, MC, USA*

ACUTE FULMINATING meningococcemia, marked by petechial eruption and bilateral adrenal hemorrhage and now known as the Waterhouse-Friderichsen syndrome, was first described by Voelcker[1] in 1894. This syndrome was subsequently reported by several observers[2-8] before the report of Waterhouse[9] in 1911 and that of Friderichsen[10] in 1918.

Waterhouse reviewed 14 cases from the literature and described rapid breathing and cyanosis in his own patient. Friderichsen, in describing this illness in a six-month-old child, noted cyanosis, coma with Cheyne-Stokes respirations, and a petechial rash that changed to purpuric patches before death. Small gram-negative diplococci, not identified as *Neisseria meningitidis* (meningococcus) were obtained from postmortem blood culture. Microscopic examination showed considerable hemorrhage in the adrenal gland, most severe in the "zona reticularis and the central part"[10] without evidence of necrosis.

In 1916, MacLagan and Cooke[11] associated *N. meningitidis* with bilateral adrenal hemorrhage. They distinguished between two fulminating syndromes with adrenal hemorrhage. In one, consciousness persists to the end and the spinal fluid is clear; in the other, there are meningeal signs, followed later by general flaccidity, stertorous breathing, cyanosis, and turbid spinal fluid. Daniels[12] reported that 50 percent of 126 patients dying of fulminating meningococcemia with adrenal hemorrhage did not have meningitis. His study showed an inverse correlation between the duration of life and the degree of adrenal hemorrhage.

Until 1940, when Carey[13] reported a case of Waterhouse-Friderichsen syndrome with recovery, the disease was considered universally fatal. Weinberg and McGavack[14] found that up to 1945 only 12 cases with recovery had been reported. This

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small number of recoveries is in sharp contrast to the favorable prognosis given to meningococcic infections in general since 1940, with reported recovery rates of 95 to 98.5 percent.[15,16] Several investigators[17-20] reported finding alterations in blood chemistry characteristic of adrenal insufficiency in patients with severe infections, and suggested that the circulatory collapse occurring in severe infections is due to adrenal insufficiency. There are a number of reports of the successful use of adrenal cortical extract and sodium chloride in combating peripheral collapse in infections,[18,21-24] and of their unsuccessful use.[25,26] More recently, nine instances of recovery from the Waterhouse-Friderichsen syndrome with the use of cortisone were reported.[27-34]

This case of fulminating meningococcemia and meningitis (Waterhouse-Friderichsen syndrome of the encephalomyelitis type) is reported because of (1) the dramatic recovery of the patient from a profound state of shock of about 3½ hours' duration when treated with massive doses of aqueous adrenal cortical extract in addition to desoxycorticosterone acetate, antibiotics, fluids, and electrolytes; (2) the development of acute arthritis of a single joint during the active stage of the disease; and (3) the development of hypopotassemia early in the course of the disease.

CASE REPORT

A 23-year-old soldier was admitted to the emergency room of this hospital on 4 February 1951 in a profound state of shock. He could be roused only with great difficulty. There was a 2-day history of headache and weakness of the right arm. Nausea, frequent vomiting, and pain in both lower extremities appeared on the day of admission. He was brought to the hospital after he had collapsed in his quarters.

Physical examination on admission revealed an acutely ill, prostrate, semistuporous white man in profound shock. The rectal temperture was 101.4° F. The radial pulses were imperceptible and blood pressure was unobtainable in either arm. The respirations were 24 per minute and shallow. The patient's skin was ashen gray, and his lips, fingers, and toes were cyanotic. His extremities were cold and he was perspiring profusely. A maculopapular rash was present on the dorsum of each wrist. A few scattered lesions were visible over the chest, abdomen, upper thighs, and on the hard palate. Small subconjunctival hemorrhages were present bilaterally. The skin lesions were rounded, well-defined maculopapules with dark centers surrounded by a pink zone, and measured 3 to 5 mm. in diameter. The pupils were contracted and did not react to light. Funduscopic examination revealed slight blurring of the disk margin bilaterally. The lungs were normal to percussion and auscultation. Heart tones were of poor quality and distant. The heart rate was 104 to 120 per minute with a regular

rhythm. No cardiac murmurs were present. The abdomen was flat and soft; no masses were palpable. Bowel peristalsis was normal. The deep tendon reflexes were hypoactive throughout, but definitely more decreased on the right. The plantar response was flexor, and the Kernig and Brudzinski signs were markedly positive. There was definite weakness of both upper and lower extremities. Findings of the remainder of the neurologic examination, including examination of the cranial nerves, were normal. Examination of the blood revealed an erythrocyte count of 4.7 million per cu. mm.; hemoglobin, 13 grams per 100 ml.; hematocrit, 41 percent; and sedimentation rate, 20 mm. per hour (Wintrobe). The leukocyte count was 21,400 per cu. mm., with 88 percent neutrophils, 8 percent lymphocytes, and 4 percent monocytes. The cardiolipin test for syphilis was negative. Urinalysis revealed a specific gravity of 1.019 and there was a 2-plus reaction for albumin. Microscopic examination of the urine was negative. Lumbar puncture revealed a faintly turbid fluid containing 370 leukocytes per cu. mm., with 80 percent neutrophils and 20 percent lymphocytes. Spinal fluid sugar was 92 mg. per 100 ml. and protein was 198 mg. per 100 ml. Gram-negative diplococci were identified on direct smear of the spinal fluid. Blood and spinal fluid culture performed on admission and reported 48 hours later revealed a gram-negative diplococcus identified morphologically, biochemically, and serologically as *N. meningitidis*.

One unit of plasma and 1 liter of a one-sixth molar sodium lactate, with 5 grams of sodium sulfadiazine added, were given intravenously in the emergency room. On admission to the ward, 40 ml. of adrenal cortical extract were injected intravenously and the patient was placed in an oxygen tent. No blood pressure was obtainable in either arm for 3 hours and 15 minutes after admission. During this period, the patient received 120 ml. of adrenal cortical extract intravenously, 20 mg. of desoxycorticosterone acetate, and 1 ml. of adrenalin (brand of epinephrine) in oil intramuscularly. During the first 9 hours after admission he received a total of 160 ml. of adrenal cortical extract intravenously, 40 mg. of desoxycorticosterone acetate, and 1 ml. of adrenalin intramuscularly. Crystalline penicillin G, 240 mg. (400,000 units) intramuscularly, was given every 3 hours. The first blood pressure reading was 98/60 mm. Hg and the pulse rate at this time was 104 per minute. Five hours after admission, the blood pressure was 110/80 mm. Hg; the radial pulse was 110 per minute and of good volume. The color improved, but the patient continued to perspire profusely. He remained extremely restless and confused, requiring restraint for many hours. There were frequent watery stools and urinary incontinence during the first 20 hours of hospitalization. Thereafter, the patient was oriented, but remained very drowsy. He continued to retch and vomit frequently through the third hospital day. When the intravenous dosage of adrenal cortical extract was reduced to 5 ml. every 4 hours, the systolic blood pressure was noted to fall. The dosage was then increased to 5 ml. every 2 hours. Thereafter, the systolic pressure rose slowly and remained steady between 104 and 108 mm. Hg.

On the third hospital day, the erythrocyte count was 3.94 million per cu. mm.; hemoglobin, 12.5 grams per 100 ml.; hematocrit, 38 percent; and sedimentation rate, 40 mm. per hour (Wintrobe). Urinalysis showed a specific gravity of 1.024 with 3-plus reaction for albumin and 1-plus reaction for sugar. Microscopic examination of the urine showed no sulfonamide crystals present. Serum chloride was 493 mg. per 100 ml.; CO_2 combining power, 74 volumes percent; blood urea nitrogen, 13.1 mg. per 100 ml.; and blood sulfonamide level, 12.0 mg. per 100 ml. A roentgenogram of the abdomen was made to rule out possible intestinal obstruction, suspected because of persistent vomiting and abdominal cramps with moderate abdominal rigidity and distention. No abnormal calcifications or gas accumulations were observed. The electrocardiogram at this time revealed prolongation of the Q-T interval, and S-T segment and T-wave changes compatible with hypopotassemia (fig. 1A). Nasal gavage was begun with 60 ml. of orange juice and milk every 2 hours. One gram of potassium acetate was mixed with the feedings 4 times a day. The urinary output during the 24-hour period of the third hospital day was only 720 ml., despite 3 liters of fluid administered intravenously. The vomitus totaled 1,200 ml. After the introduction of potassium acetate, orange juice, and milk, there was remarkable improvement in his clinical condition. Vomiting ceased, abdominal cramps subsided, distention and rigidity decreased markedly, and the urinary output increased. The nasal tube was removed on the fifth hospital day and a soft diet was started. Orange juice and milk were given *ad lib.;* potassium acetate was continued in 1-gram capsules with food 4 times daily.

On the fifth hospital day, the pulse rate decreased to 50 per minute while the blood pressure was 128/60 mm. Hg. With this change, adrenal cortical extract was then administered intramuscularly and the dosage of adrenal cortical extract and desoxycorticosterone acetate was gradually reduced until they were discontinued on the seventh and eleventh hospital days respectively.

On the seventh hospital day, after the patient had received about 15 grams of potassium acetate orally, 1 liter of orange juice and milk daily for 4 days, and 2 days of a soft diet, the serum sodium was 142 mEq/L and the serum potassium was 3.1 mEq/L.* The serum chloride was 513 mg. per 100 ml. and the CO_2 combining power was 54 volumes percent. At this time, the electrocardiogram showed only slight improvement when compared with the previous tracing (fig. 1B).

On the eighth day of illness the patient exhibited a red, hot, swollen, painful right elbow without evidence of effusion. The temperature rose to 101° F. Roentgenographic examination of the elbow joint was normal. The elbow was splinted, elevated, and warm moist heat was applied. The temperature remained between 100° and 101° F. to the

*The serum sodium and potassium determinations were made at The Maloney Clinic of the University of Pennsylvania Hospital, Philadelphia, Pa., in the Laboratory of Dr. J. R. Elkinton. Normal standards for potassium are 3.5-5.3 mEq/L.

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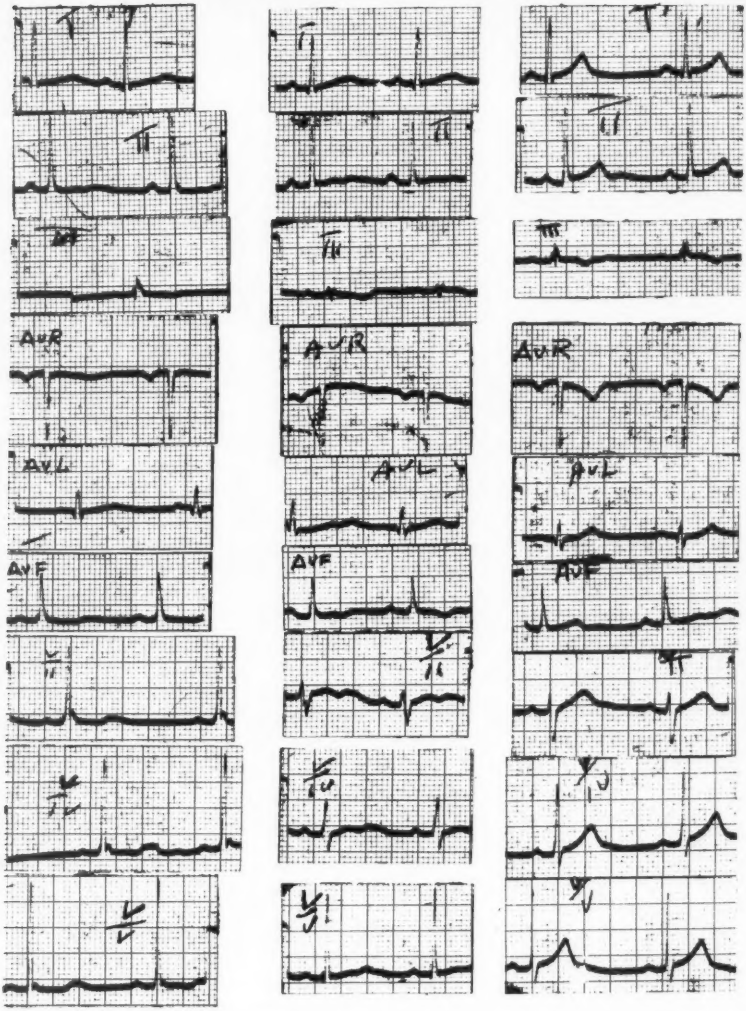

(A) Third hospital day (B) Seventh hospital day (C) Thirteenth hospital day

Figure 1. Electrocardiograms: (A) On third hospital day, showing prolongation of Q-T interval, and S-T segment and T-wave changes. (B) On seventh hospital day, showing slight improvement. (C) Normal findings on thirteenth hospital day.

fifteenth day of illness. Thereafter the patient was afebrile. At this time, because of nausea and "heartburn," the dosage of potassium acetate was reduced to 3 grams orally every 24 hours. The right elbow showed marked clinical improvement and the petechiae had disappeared. After the thirteenth hospital day, the patient had no complaints and felt well.

A lumbar puncture repeated on the fifteenth day of illness revealed 1 leukocyte per cu. mm.; sugar, 41 mg. per 100 ml.; and total protein, 34.2 mg. per 100 ml. Blood and spinal fluid cultures were reported to be sterile after 2 weeks' incubation. The first normal electrocardiogram was reported 16 days after the onset of illness and 11 days after starting potassium acetate, orange juice, and milk, followed by a normal diet (fig. 1C). Penicillin and sulfadiazine were discontinued on the twenty-second and twenty-fifth hospital days respectively. The patient was sent on a 12-day convalescent leave on the twenty-ninth day of illness and returned to full duty on the fifty-seventh day of illness.

DISCUSSION

Recovery of patients clinically manifesting the Waterhouse-Friderichsen syndrome who received adrenal hormones in addition to sulfonamide therapy has been reported.[13, 14, 27–29, 35–39] Not all patients with acute, fatal infections, particularly not all adults exhibiting the Waterhouse-Friderichsen syndrome, have been found at autopsy to have had massive adrenal hemorrhage.[17, 18, 35] Kinsman and others[35] were unable to distinguish clinically those patients who exhibited massive adrenal hemorrhage at autopsy from those who exhibited only degenerative changes in the adrenal glands.

Rich[17] reported the association of adrenal cortical damage with acute infections, and suggested the possible relationship of circulatory collapse to this adrenal damage. Ebert and Stead[40] found that shock accompanying severe acute infection differs from that following trauma or hemorrhage, because in infection the plasma volume is not decreased and transfusions are not beneficial. It is not due to a diminished venous return to the heart from pooling in the smaller vessels, because filling of the venous system does not improve the circulation. In a patient with Waterhouse-Friderichsen syndrome who recovered, Grubschmidt and associates[39] convincingly demonstrated that the blood pressure is definitely affected by the administration of adrenal cortical hormones. Others[14, 27, 28] have recorded this same effect in patients who recovered. In view of the now recognized importance of the adrenal cortex in the maintenance of blood pressure, it seems probable that the cortical lesions described by Rich may at least be a contributing factor in some instances of circulatory collapse during acute infections.

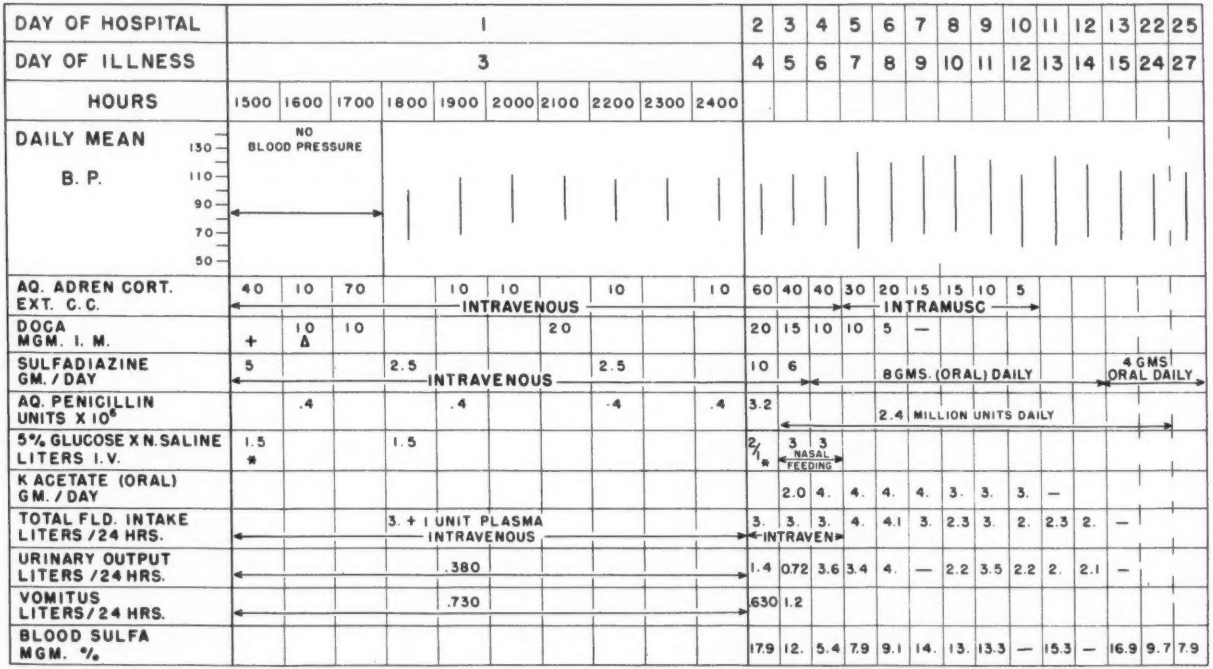
DAY OF HOSPITAL
DAY OF ILLNESS
HOURS
1500 1600 1700 1800 1900 2000 2100 2200 2300 2400
1 2 3 4 5 6 7 8 9 10 11 12 13 22 25
3 4 5 6 7 8 9 10 11 12 13 14 15 24 27
DAILY MEAN B. P.
130 110 90 70 50
NO BLOOD PRESSURE
AQ. ADREN CORT. EXT. C.C.
40 10 70 10 10 10 10
60 40 40 30 20 15 15 10 5
INTRAVENOUS
INTRAMUSC
DOCA MGM. I. M.
+ 10 Δ 10 20
20 15 10 10 5 —
SULFADIAZINE GM. / DAY
5 2.5 2.5
10 6
INTRAVENOUS
8 GMS. (ORAL) DAILY
4 GMS ORAL DAILY
AQ. PENICILLIN UNITS X 10⁶
.4 .4 .4 .4
3.2
2.4 MILLION UNITS DAILY
5% GLUCOSE X N. SALINE LITERS I. V.
1.5 * 1.5
2/1 * 3 3
NASAL FEEDING
K ACETATE (ORAL) GM. / DAY
2.0 4. 4. 4. 4. 3. 3. 3. —
TOTAL FLD. INTAKE LITERS / 24 HRS.
3. + 1 UNIT PLASMA INTRAVENOUS
3. 3. 3. 4. 4.1 3. 2.3 3. 2. 2.3 2. —
INTRAVEN
URINARY OUTPUT LITERS / 24 HRS.
.380
1.4 0.72 3.6 3.4 4. — 2.2 3.5 2.2 2. 2.1 —
VOMITUS LITERS / 24 HRS.
.730
.630 1.2
BLOOD SULFA MGM. %
17.9 12. 5.4 7.9 9.1 14. 13. 13.3 — 15.3 — 16.9 9.7 7.9
+ 1 UNIT PLASMA
Δ 1 C. C. ADRENALIN IN OIL
* 1/6 M. SOD. LACTATE SOL.

Figure 2. Record of therapy in patient with Waterhouse-Friderichsen syndrome.

Our patient recovered within 3 hours and 15 minutes from a severe state of shock, after receiving adrenal cortical extract intravenously, desoxycorticosterone acetate, adrenalin in oil intramuscularly, plasma, fluids, and sulfadiazine intravenously. A minor toxic effect from the administered adrenal hormones was observed on the fifth hospital day after he had received 300 ml. of adrenal cortical extract and 85 mg. of desoxycorticosterone acetate. At this time, the blood pressure suddenly rose from an average of 110/75 to 128/58 mm. Hg and the pulse rate dropped from 75 to 50 per minute (fig. 2). Adrenal cortical extract was subsequently given intramuscularly instead of intravenously, and the dosage of adrenal cortical extract and desoxycorticosterone acetate was gradually decreased. Only 3,500 ml. of fluid intravenously was given during the first 9 hours after admission. Thereafter, no more than 3 liters of fluids were administered intravenously in a 24-hour period.

The patient developed clinical evidence of hypopotassemia by the third hospital day, evidenced by marked weakness, lassitude, drowsiness, and abdominal cramps with distention, at a time when his general condition was improved. Electrocardiographic evidence confirmed this clinical impression.

The above symptoms definitely lessened with the administration of potassium acetate and foods high in potassium content (orange juice and milk). The development of hypopotassemia, as noted by others,[41, 42] was attributed to excessive vomiting, diarrhea, and dehydration as well as to the administration of intravenous fluids and large doses of adrenal cortical hormones.

On the seventh hospital day, serum sodium was within normal limits (142 mEq/L) but the serum potassium was only 3.1 mEq/L despite the administration of 4 grams of potassium acetate daily for 4 days, in addition to liberal amounts of orange juice and milk orally. It should also be noted that the electrocardiogram returned to normal 11 days after treatment with potassium acetate, orange juice, and milk was started.

Acute arthritis of the right elbow occurred in our patient on the ninth day of his illness. Fox and Gilbert[43] found the incidence of articular complications to have been 1.9 percent before the use of sulfonamides and 11.8 percent after the advent of chemotherapy, a discrepancy which may well be accounted for by the lessened mortality with more opportunity for complications. Conservative medical treatment, including splinting, moist heat, elevation of the part, sulfadiazine, and penicillin, were employed. Conservative treatment of articular complications in meningococcal infections has been previously recommended.[44]

The patient did not manifest significant depression of renal function at any time. Transitory albuminuria disappeared by the

Figure 2. Record of therapy in patient with Waterhouse-Friderichsen syndrome.

fourth hospital day. The CO_2 combining power determinations were altered on the third and fourth hospital days only, being 74 and 69 volumes percent (normal 50=65 volumes percent) respectively. Serum chloride was within normal limits throughout his illness. The blood urea nitrogen on the third and twenty-second hospital days was normal.

SUMMARY

Recovery of a 23-year-old man with fulminating meningococcemia and meningococcic meningitis (Waterhouse-Friderichsen syndrome of the encephalomyelitic type) is reported.

Recovery from severe shock and circulatory collapse resulted after a period of 3 hours and 15 minutes. Massive initial doses of adrenal cortical extract intravenously and desoxycorticosterone acetate intramuscularly, in addition to sulfadiazine intravenously and crystalline penicillin intramuscularly, were employed. Excessive intravenous fluid and colloid therapy was avoided.

Clinical evidence of hypopotassemia was supported by electrocardiographic changes and by a low level of serum potassium during the recovery phase. There was good response to the oral administration of potassium acetate, orange juice, and food. Acute arthritis of the right elbow developed on the eighth day of illness; conservative treatment was followed by complete recovery. No significant blood chemical changes or renal depression was noted during the course of the illness.

A more favorable prognosis may now be given to this previously fatal syndrome with the early administration of adrenal cortical hormones, including cortisone, in addition to sulfadiazine and penicillin.

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THE PRACTICAL PRACTITIONER

Time and again the criticism is levelled at medical schools that they are not turning out "practical" men. By "practical" I fear is often meant the sort of man who can empty a waiting-room containing 60 patients in one hour and who moves with facility amongst the maze of forms and certificates which bulk so largely in general practice. If such is a legitimate aim of undergraduate instruction, then I am happy to believe schools are failing in their task. These things are certainly important, but there is something that transcends them which if the practitioner lacks renders his "practical" skills more of a liability than an asset, and that is the capacity to think straight, to know how to diagnose, not in the sense of having memorized tables of differential diagnosis but of being able patiently to collect evidence, to know what constitutes good evidence and what constitutes bad, and to recognize an unusual situation when it arises and from what source to get enlightenment. In brief, I must confess to a horror of "sound practical" men, as so often I have found them dogmatic empiricists, confident in their own ignorance—veritable sealed patterns of belief as proof against new knowledge as a member of the Inquisition against heresy.

—W. MELVILLE ARNOTT
in *Proceedings of the First World Conference on Medical Education,*
Oxford University Press, 1954, p. 280-281

Agranulocytosis Complicating PAS and Streptomycin Therapy

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MANY DRUGS have been indicted as causes of agranulocytosis, and the list grows almost daily. Most frequent offenders are:

Aminopyrine and other coal-tar derivatives
Organic arsenicals
Cinchophens
Gold salts
Sulfonamides
Organic antimonials
Acetophenetidin
Dinitrophenol
Thiouracil derivatives
Anticonvulsant drugs
Barbiturates
Quinine
Bismuth
DDT
Tripelennamine hydrochloride
Methaphenilene hydrochloride
Chloramphenicol
Phenylbutazone
Hydralazine hydrochloride
Procaine derivatives
Mercurial diuretics
Methimazole

It is believed that para-aminosalicylic acid (PAS) must be added to this compendium and the potentially dangerous complication of agranulocytosis in present-day antituberculous therapy must be recognized early and vigorously treated.

Since PAS was introduced in 1946, its use as an antimicrobial agent in the treatment of patients with tuberculosis has become world-wide. Various complications or reactions as a result of its use have been reported and excellently summarized by Korst.[1] These include:

Urticaria
Fever
Anorexia
Emesis
Löfflers eosinophilic pneumonitis
Meningeal irritation with elevated cells in the cerebrospinal fluid

From U. S. Army Hospital, Fort Hood, Tex.

Diarrhea	Albuminuria and/or anuria
Jaundice	Polyneuritis
Eosinophilia	Water retention, hypokalemia and hemolytic anemia
Myxedema	
Toxic hepatitis	Exfoliative dermatitis

Toxic manifestations usually have appeared within the first 6 or 7 weeks of PAS administration, the average being 3 weeks. Warring and Howlett[2] reported a reaction incidence of 2.5 percent of 275 patients on PAS therapy, primarily fever and urticaria. Blood dyscrasias were not reported in a comprehensive review by Lyght and associates.[3]

The following case report demonstrates a severe agranulocytosis during PAS therapy, a more than coincidental abrupt cessation of fever, and reversal of the leukopenia and neutropenia following steroid treatment.

CASE REPORT

The patient was a 39-year-old white woman who was admitted to this hospital on 7 January 1955 complaining of headache and fever. She had felt well until 3 days prior to admission when she experienced a chilly sensation. This recurred the following day as well. On the day prior to admission she developed fever and chills, severe generalized headache, moderately severe sore throat, generalized aching and marked prostration.

Past History. Past history was significant in that the patient had a wedge resection of the left lower pulmonary lobe done at Brooke Army Hospital on 4 October 1954 with removal of a granuloma consistent with tuberculosis.

For three weeks prior to the operation the patient had received streptomycin, 1 gram daily for the first week, and then every third day. There was concomitant administration of isoniazid in daily doses of 300 mg. The streptomycin was continued in daily doses of 0.5 gram for 10 days postoperatively and was then stopped because no acid-fast bacilli were seen in the excised lesion.

However, on 29 November the cultured material from the lesion revealed the presence of *Mycobacterium tuberculosis*, and 2 grams of streptomycin every third day was restarted. In addition, 12 grams of PAS was given daily for the first time. Both drugs were continued until admission to this hospital (5½ weeks postoperatively). She had taken no other medication and was exposed to no known toxic agents.

Physical Examination Findings. The patient was acutely ill. Her temperature was 102.4° F.; pulse, 116; respirations, 20; and blood pressure, 120/80 mm. Hg. The pharynx was moderately injected, but

no ulceration was present. There were no other abnormal physical findings.

Laboratory Findings. Laboratory examination on admission revealed a white blood cell count of 700 per cu. mm. with a differential count of 12 percent neutrophils, 84 percent lymphocytes, 1 percent monocytes, and 3 percent eosinophils. The hemoglobin was 12 grams per 100 ml.; and hematocrit, 35 percent; with an uncorrected sedimentation rate (Wintrobe method) of 13 mm./hr. Urinalysis and a roentgenogram of the chest were normal.

The report of the white blood cell count made on admission was received on the third hospital day. Prior to this the patient was believed to have a viral upper respiratory infection and received only symptomatic therapy. During this period the patient appeared ill; the temperature curve was septic; physical findings remained unchanged. No growth was obtained from the blood culture.

Course in Hospital. When the white blood cell count was reported it was apparent that a severe agranulocytic process was present either from streptomycin or PAS. Consequently, these drugs were stopped and penicillin was started at a dosage level of 360 mg. (600,000 units) twice daily. Two days later, with no appreciable change in her clinical picture, corticotropin (ACTH) was begun intravenously. Twenty units were given over an 8-hour period daily for 3 days. Cortisone therapy was then instituted, the first days' dose was 200 mg., and then 100 mg. was given for 4 days. The dosage was maintained at 75 mg. for 6 days, and then was decreased to 50 mg. for the next week. Twenty-five milligrams daily was then given for the last week of therapy.

The differential white blood cell count revealed only 1 percent neutrophils and a total count of 1,600 per cu. mm. on the day steroid therapy was instituted.

Clinically the patient improved dramatically on the evening of the fifth hospital day after receiving her first intravenous injection of ACTH. Twenty-four hours later she was essentially symptom free except for generalized weakness which gradually disappeared during her hospital stay.

Examination of bone marrow on the fifth hospital day revealed a hypocellular marrow with relative lymphocytic hyperplasia and arrest of granulocytic maturity at the juvenile nonsegmented neutrophil stage. Erythropoiesis appeared normal.

Repeated red blood cell counts, hemoglobin determinations and hematocrits were also done in order to determine if an aplastic process was present. Although the erythrocyte estimations varied, the average count was 3.4 million and the average hemoglobin value was 10.5 to 11 grams. The hematocrit readings were more consistent and were mainly in the range of 34 to 36 percent. The red cells were described as hypochromic. The sedimentation rate, which was normal

on admission, rose to 63 mm./hr. (40 mm./hr., corrected) on the third hospital day, and remained at that level until the ninth hospital day when it began decreasing. By the twelfth hospital day, the sedimentation rate had reached normal levels.

Reticulocyte counts were within normal limits until the twelfth hospital day, when the percentage rose to 2.4 percent. The next day it was 2.5 percent, and then again returned to the previous low levels. Frequent platelet counts were within normal limits. A tourniquet test was negative.

The patient was asymptomatic on discharge on the twentieth hospital day. On discharge her white blood cell count was 9,100 per cu. mm. with 70 percent neutrophils, 29 percent lymphocytes, and 1 percent monocytes. One week later, as therapy was being stopped, the white blood cell count was 6,800 per cu. mm. with 60 percent neutrophils, 30 percent lymphocytes, 8 percent monocytes, and 2 percent eosinophils.

DISCUSSION

This patient had a severe agranulocytosis with an abrupt onset manifested by fever, malaise, and mildly sore throat occurring in the sixth week of PAS and streptomycin therapy. She had previously received intensive treatment with streptomycin and isoniazid prior to surgical intervention, without incident. Streptomycin has been reported as a cause of aplastic anemia,[4] and cannot be ruled out as the offending agent in this patient. We believe this unlikely, however, because she had received streptomycin previously with no apparent ill effects. In a few cases of acute hematogenous tuberculosis reported by McDermott,[5] leukopenia of from 1,500 to 3,000 cells per cu. mm. were noted during the course of streptomycin therapy. The agranulocytosis in our patient apparently occurred as a result of an allergic sensitivity of the bone marrow leukocytes to the PAS without other hematologic manifestations.

An aplastic process was considered in the differential diagnosis but was not believed tenable due to the bone marrow study which showed normal erythropoiesis. In addition, there was no thrombocytopenia or bleeding diathesis in this patient.

Although several reports[2,6] show successful desensitization to PAS after reactions to it had occurred, it is believed that in the future other agents should be used in treating this woman because of the severity of her attack.

Since the advent of antibiotics, mortality from agranulocytosis has plummeted from an otherwise hopeless outcome in most cases to a better, though still serious prognosis. We were fortunate in hospitalizing our patient shortly after the onset of her symptoms. Death usually occurs from overwhelming sepsis during the

suppressive phase of the granulocyte series unless the invading organism can be inhibited by prompt and adequate therapy. Penicillin in large doses was the treatment used although, until the startling response to ACTH appeared, the patient continued to regress. The use of steroids in agranulocytosis is controversial.[7-10] Some authorities believe that infection is spread by their administration. There is no definite proof that ACTH and cortisone adversely affect the course of pulmonary tuberculosis. These factors were carefully weighed, and in view of the gravity of the situation, it was decided to assume the calculated risk of steroid therapy. The hypersensitivity state and its accompanying bone marrow changes were the immediate concern and thus ACTH intravenously followed by cortisone was administered. The immediate defervescence and the quick response in leukopoiesis represent much more than just coincidence. Dameshek[11] stated that the immediate shock of hypersensitivity to a drug in the bone marrow is a reduction in granulocyte precursors followed by a loss of mature granulocytes thereby leaving the marrow with practically no granulocytes. When marrow in our patient was examined, a later stage was seen which follows the initial insult, *i. e.*, a maturation arrest where precursors were present in the marrow but mature granulocytes were conspicuously absent.

Recovery, if it occurs, is dependent upon the patient being able (1) to cope with the shock of the granulocytopenia by his own cellular reactivity; and (2) to combat the bacterial invasion, which occurs inevitably in a body stripped of its granulocyte defenses.[11] The use of steroids in our patient apparently adequately controlled the shock of the granulocytopenia until recovery ensued.

SUMMARY AND CONCLUSIONS

A patient with agranulocytosis, probably due to PAS administration, was treated with antibiotics and steroids and made an uneventful recovery. No other similar reaction to this drug has been found in the available literature. It is not advocated however that steroids alone be used in the face of overwhelming infection. They should be reserved for those patients in whom either the infection is under some control with antibiotics, or the course is unrelentingly downward due to a suspected hypersensitivity phenomenon.

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COOPERATION IN PUBLIC RELATIONS

Our profession is an institution of character with a good reputation, and we are attempting to demonstrate that the profession operates primarily in the public interest. This has been the basis for our entire effort. We have needed and tried to secure the full cooperation of all physicians, their families, office employees, and hospital personnel. The active cooperation of this entire group is essential if we are to convince the public that as a profession we are interested in them and in their problems; that we are aware that we are dealing with human beings who live, suffer, have problems, ambitions and aspirations, yet love and err, even as you and I. As a group we must get away from, and show the public that we are away from, any tendency to treat patients impersonally. The human relationship is most important in all our dealings with patients. When this is lost, the patient loses his individuality and cannot secure or make the most efficient use of the care and consideration needed to promote good health and keep our public relations on a high plane.

—VERNE S. CAVINESS, M. D.
in *North Carolina Medical Journal,*
p. 562, Nov. 1954

Delayed Vasospasm of the Glans Penis Following Circumcision

Treatment With Sympathetic Block

BERNARD V. WETCHLER, *First Lieutenant, MC, USA*
CHARLES A. MOORE, *Major, MC, USA*

CIRCUMCISION of the adult is considered by both the professional and lay public as a minor operation. It is often performed during an office visit.

The operative procedure, however, is attended by its full share of complications, both during and after operation. Some of these are: postoperative hemorrhage; infection; disruption of the suture line secondary to an erection; and, rarely, excision of too much foreskin. The occasional occurrence of the above, together with proper measures of control and/or treatment, is well established.[1]

The purpose of this article is to present a different complication, one which has not heretofore been observed by us nor to the best of our knowledge been reported in the literature.

CASE REPORT

A 21-year-old man on 3 February 1955 underwent a circumcision for the correction of a marked phimosis.

Anesthesia was carried out according to the technic of Light, Weygandt, and Wetchler. A 1-percent solution of procaine hydrochloride, with epinephrine added to make a concentration of not greater than 1:200,000 (5 drops of 1:1,000 to 30 ml. of procaine) was injected into each of the following four sites at the base of the penis. Three milliliters of solution were injected dorsally on both sides of the midline to anesthetize the dorsal nerves. Two milliliters were then injected ventrally on both sides of the urethra. The patient, by maintaining gentle traction on the foreskin during the paraurethral injections, facilitated the procedure. An attempt was made to keep all injections external to the corpora. This method has been used in over 1,000 circumcisions or operations on the glans penis in the adult patient without the occurrence of any complications attributable to it.

The operative technic was that of the dorsal and ventral slit method. The operative and the immediate postoperative courses were uneventful.

From U. S. Army Hospital, Fort Bragg, N. C. Dr. Wetchler is now at 6310 Dieterle Crescent, Rego Park, N. Y.

The patient was discharged to a light duty status 48 hours after operation. At this time the operative result appeared excellent. There was only slight edema about the frenulum, the suture line was intact, and no discoloration was present.

On 8 February (5 days after operation) the patient returned to the urologic clinic because he thought that his penis had become infected. Further questioning brought out that on the evening of 7 February, while getting ready for bed, he noticed that the glans penis was blue. By morning the glans penis was darker in color and felt cool. The patient had no pain or any urinary difficulties.

There was marked cyanosis of the glans and frenulum. The areas directly surrounding the urethral meatus and between the meatus and the frenulum were especially cyanotic. A definite and abrupt temperature difference was present between the shaft and the glans penis, the glans being much cooler. The sharpest line of demarcation occurred in the region of the corona. Mild edema of the frenulum was present. No evidence of thrombosis, trauma, or infection could be found.

The patient was readmitted to the hospital and an immediate evaluation by the anesthesiologist was requested. From both the history and physical examination, it was believed that vasospasm was the basis for the cyanosis and coolness, the most likely cause being the trauma of operation. The condition was classed as a postoperative reflex sympathetic dystrophy.[2,3] Sympathetic nerve blocks were definitely indicated, and because the symptoms were referable to a midline organ, the epidural route for performing a sympathetic block was chosen, for this would achieve the desired bilateral effect.

At 1300 hours, 25 ml. of a 0.15 percent solution of pontocaine (brand of tetracaine hydrochloride) were injected between the third and fourth lumbar interspace with the patient in the sitting-up position. There was an immediate temperature increase in the glans penis, and within 10 minutes the temperature of the glans approximated that of the shaft. Cyanosis decreased by about 85 percent.

This status was maintained until the morning of 10 February, when the cyanosis became more apparent. The epidural injection was repeated, and following this all cyanosis disappeared. There was no subsequent recurrence of any cyanosis or coolness.

The patient was discharged on 14 February. He returned for a routine clinic check-up on 21 February and was found to be completely asymptomatic.

SUMMARY

The initiating cause of a case of delayed postoperative (circumcision) vasospasm was assumed to be the operative procedure. A diagnosis was made of a reflex sympathetic dystrophy of the glans penis subsequent to operation. The patient was treated with chem-

ical sympathetic blocks via the epidural route and had a dramatic response to this form of therapy. Early diagnosis and proper treatment may have averted a serious consequence of a minor surgical procedure.

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LITERARY BOOBY TRAPS

Latin: Is there any good reason why the modern physician's writing must glitter with Latin phrases? I want "measles," not "morbilli." I see no reason for "in situ," "locus minoris resistentiae," and "modus operandi." And when a doctor writes "pes planus" for "flat feet," I simply refuse to trust him. He's clearly a mannered pedant. Similarly, there's no justification for such terms as "pyrexia" for "fever," "etiology" for "cause," etc. "Gallstones" is English; "cholelithiasis" isn't. And any writer who says "podagra" when he means "gout" would probably say "agrypnia" instead of "insomnia."

Unconventional abbreviations: To you, "P. A." may mean "pernicious anemia." To the radiologist, it means "postero-anterior." And as far as I'm concerned, it's "paralysis agitans." Which proves there's no booby trap in medical writing quite so dangerous as the loosely used abbreviation. Even the simple letter "O" can stand for eye, pint, oxygen, an electrode opening, or a blood group without agglutinogen.

Split-second percentages: I begin to suspect the authenticity of a medical paper if its author carries percentage figures beyond one decimal point. Does the fellow *really* expect me to believe there's a significant difference between a recovery rate of 87.1 percent and a rate of 87.13 percent? In my book, such extraordinary precision also makes the man's findings sound ridiculous.

Editorial "we": Finally, may I be permitted a raised eyebrow in the direction of the solo practitioner who grandiloquently announces: "We have had good results with . . ." when he really means, "I have had . . ."etc.? Does he expect me to believe he's a one-man Mayo Clinic?

—HENRY A. DAVIDSON, M. D.
in *Medical Economics,*
p. 192, Jan. 1955

351448 O - 55 - 8

Hernia Due to Nonpenetrating Trauma

ROBERT M. HARDAWAY, *Lieutenant Colonel, MC, USA*
COLEMAN J. CONNOLLY, *Major, MC, USA*

HERNIAS of the lung or abdominal viscera secondary to penetrating wounds or surgical intervention occur frequently. However, hernias, either of the lung or abdominal viscera, due to blunt, nonpenetrating trauma are rare.

About 200 cases of lung hernia from penetrating or surgical trauma have been reported, but only 3 adequately reported cases of lung hernia secondary to nonpenetrating trauma have been found in the recent American literature.[1-3] Maurer and Blades[1] in their excellent article on lung hernia reported 11 cases, only 1 of which was due to blunt, nonpenetrating trauma. Their cases do not include spontaneous lung hernias, such as herniation of the lung into the neck through Sibson's fascia[4-6] or congenital intercostal hernias.[7]

Recently two cases observed at this hospital demonstrated hernia from nonpenetrating trauma to the musculature attaching to the ribs. One lesion was thoracic, the other was subcostal and abdominal.

CASE REPORTS

Case 1. A 47-year-old man was driving a piece of heavy road equipment at the Engineer Proving Grounds, Fort Belvoir, Va., on 17 August 1954. He sustained crushing injury to the right side of his chest when the machine upset in a ditch. On admission to this hospital he had a pronounced bulge between his ninth and tenth ribs on the right side when he strained. Subcutaneous emphysema was palpable, and a defect through which the lung was palpated as the patient strained could be felt in the muscular thoracic wall. No clinical or roentgenologic evidence of fractured ribs or pneumothorax was present. A diagnosis of lung hernia was evident.

The patient's ribs were taped, but without success. On 21 August surgical repair was undertaken. A 4-inch incision over the ninth interspace, revealed a 1-inch tear splitting the fibers of the otherwise intact latissimus dorsi muscle. The muscle was cut to expose the intercostal space below. The intercostal muscles were entirely torn, completely separating the ribs for a distance of 4 inches (fig. 1). This tear involved the parietal pleura so that the lung was immediately in contact with

From U. S. Army Hospital, Fort Belvoir, Va. Col. Hardaway is now assigned to the 97th General Hospital, APO 757, New York, N. Y.

the latissimus dorsi muscle. The chest cavity was explored through this opening, and the lung and the diaphragm were found to be intact. A large right-angle chest drain was inserted through the ninth interspace anteriorly and brought out through a separate stab wound. Two pericostal sutures of double No. 2 catgut were inserted. The inter-

Figure 1 (case 1). The latissimus dorsi muscle has been cut, revealing the defect between the ribs with lung showing through. Note the portion of rib denuded of muscle. This portion requires a flap from the periosteum.

costal bundles were sutured with interrupted No. 0 cotton, except for a 1-inch area where there was no intercostal bundle remaining on the lower side. At this point an incision was made in the periosteum on the lower side of the rib and the periosteum turned upward and sutured to the upper part of the intercostal bundle. All sutures were then tied, using a rib approximater. The latissumus dorsi muscle was sutured with interrupted No. 0 cotton. Subcutaneous tissue was closed with interrupted No. 0000 cotton as was the skin. The chest drain was attached to a water-sealed bottle.

The patient's postoperative course was uneventful. The drainage tube was removed on the second postoperative day, and the patient was discharged on the tenth postoperative day with his wound well healed.

Case 2. A 36-year-old woman was in an automobile collision on 10 November 1953, in which she received blunt, nonpenetrating trauma to her left flank. An emergency splenectomy was performed at another

hospital, and on her tenth postoperative day she was transferred to this hospital. She had marked tenderness of the left flank associated with hematuria. Intravenous pyelogram showed extravasation of the dye from the left kidney into the perinephric tissues. Conservative therapy was decided on in view of the satisfactory 10-day course and

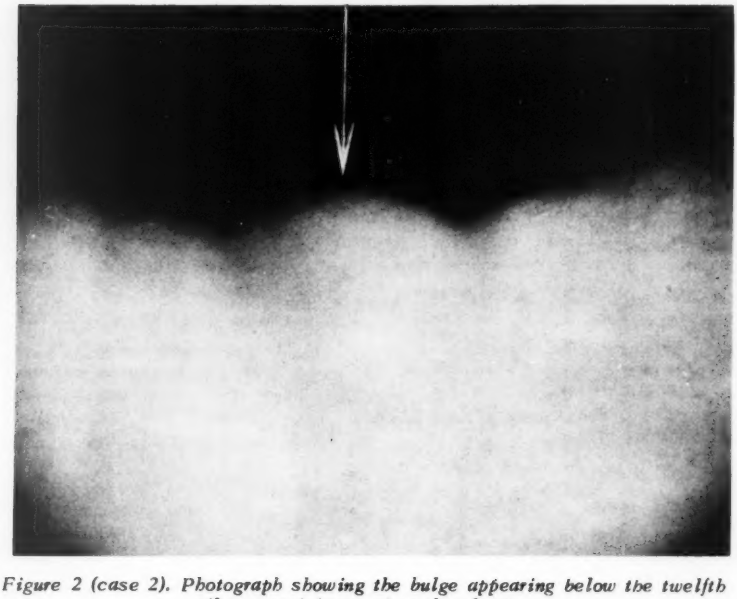

Figure 2 (case 2). Photograph showing the bulge appearing below the twelfth rib on straining against the glottis.

the lack of left flank swelling. Roentgenographic examination showed multiple fractures of the left thoracic cage but no pneumothorax. Except for a pleural effusion in her left thorax, which was tapped twice with evacuation of several hundred milliliters of serosanguineous fluid, her convalescence was uneventful. She was discharged on 19 December with a residual complaint of soreness and weather-aching in the left side of her chest.

In April 1954, the patient noticed that when she strained a bulge appeared in the midaxillary line in the subcostal area in the left flank. Examination showed a soft protrusion which appeared below the left twelfth rib on straining (fig. 2). A defect in the abdominal musculature was palpable in the subcostal area just anterior to the tip of the left twelfth rib. Roentgenographic examination showed the colon herniating through the abdominal musculature into the subcutaneous space. When the patient coughed, the diaphragm could be palpated by fingers inserted into the defect. A rupture of the diaphragm with protrusion of the lung into the hernia could not be ruled out. During the months that

followed the patient complained that the hernia was enlarging. She said that the bulging reduced her muscular strength and interfered with her coughing. On 4 October the defect was surgically repaired. A defect about 3 inches in diameter was found in all muscular layers of the abdominal wall where the oblique muscles had been pulled from their twelfth rib attachments. On forcibly inflating the lungs the diaphragm did not appear to be damaged. The perirenal fascia and the kidney were intact. The muscle layers were freed up and sutured in one layer with interrupted No. 1 cotton. The epimysium over the external oblique muscle was sutured with interrupted No. 0 cotton, and the skin and subcutaneous tissue with interrupted No. 0000 cotton. The patient's postoperative course was uneventful and she was discharged on the fourth postoperative day.

DISCUSSION

Pneumonocele, or hernia of the lung, is a condition in which the lung bulges subcutaneously out of the pleural cavity.[1-7] This lesion may be congenital or acquired, traumatic or spontaneous. Congenital ones are said to be most common in the neck through a defect in Sibson's fascia. Lungs of patients with asthma, however, also may bulge through a ruptured Sibson's fascia. Penetrating trauma is the commonest cause of lung hernia. Lung which protrudes through the skin from a traumatic lesion of the wall of the thorax, however, is not a hernia. The lung may protrude through the diaphragm, or protrude from one pleural cavity into the other. The pneumonocele rarely has a sac, which may be pleura.

A pneumonocele may produce distressing symptoms. The coughing mechanism may be interfered with, and patients may develop focal areas of atelectasis. Muscular strength may be diminished; as the patient strains in lifting, the bulging may prevent the patient from fixing the glottis. If the hernia causes local pain on coughing, the patient may suppress the cough and develop atelectasis.

The mechanism of direct trauma is obvious. Blunt, nonpenetrating trauma tears the friable muscles, leaving the tough, thick skin abraded, perhaps, but intact. In our first patient, although the bony thoracic cage was undamaged the pleura was torn; in the second, the peritoneum and diaphragm were intact and multiple fractures of the ribs of the left thoracic cage were present. At the time of operation in both patients, the severed muscle edges were smooth and shiny; no free muscle fasciculi were seen on the edges.

Repair is by simple suture of the muscle layers, or, if the muscle has been separated at its costal attachment as in the first patient, a flap of periosteum may be raised, turned back, and sutured.

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FAMILY CARE OF THE ARTERIOSCLEROTIC PATIENT

Many important advances have been made in our understanding of the arteriosclerotic process; it remains, nevertheless, that there is at the present time no adequate method of preventing or curing the process. I, personally, believe that the care of this group of patients 30 or 40 years ago was, perhaps, superior to that of today. In those days their medical needs were cared for by the old-time general practitioner, who usually had cared for them throughout part of their lives. The patient always resided until death with his or her children or grandchildren, or both, usually in his own old home. In those days the families were large and closely knit, with more relatives living within a short distance. The houses were large and spacious, and the family and social structure centered around these large homes. If necessary, another room and more rocking chairs were added to the house, accompanied by the inevitable open fireplace, clay pipes for the women, and Picnic Twist chewing tobacco for the old men. These aged people were desired and loved members of the family group and had the feeling of being wanted. Often they engaged in petty activities within their physical limits which were productive, such as knitting, mending, and other skilled handiwork. Many of their symptoms and eccentricities were described as queer or peculiar, rather than psychotic.

—A. A. MILBURN, M. D.
in *West Virginia Medical Journal,*
p. 75, Mar. 1955

Ewing's Tumor of the Zygomatic Arch

JAMES E. CHIPPS, *Lieutenant Colonel, DC, USA*
FRANCIS J. PEISEL, *Major, MC, USA*
NORMAN R. SHIPPEY, *Major, MC, USA*

NONTRAUMATIC lesions of the zygomatic arch are rarely observed. Ewing's tumor is frequently reported as primary in the jaws, and occasionally reported as primary in other bones of the skull; we are not aware, however, of any report of this tumor as primary in the zygomatic arch. Therefore, the following case is of interest and is reported even though the patient has been observed for only 5 months.

CASE REPORT

A 9-year-old boy came to the clinic because of a painless swelling overlying the left zygomatic arch. It had first been noticed by his parents a few days earlier.

Two months before examination the boy had fallen at play, sustaining a blow to the same area with subsequent pain, swelling, and slight discoloration which had largely subsided prior to the development of the present swelling. Otherwise, the past history and family history were noncontributory.

Examination revealed a smooth, 4- by 5-cm. swelling overlying the posterior two thirds of the left zygomatic arch (fig. 1). The swelling was fixed, palpably firm, and slightly tender. Mandibular excursions were slightly limited vertically and to the right but the patient had no complaints relative to mandibular function.

Radiographs showed a destructive lesion of the left zygomatic arch with loss of bone detail (fig. 2). A skeletal survey did not reveal any other osseous lesions.

A biopsy of the lesion showed sheaths of uniform round cells with relatively large, oval nuclei (fig. 3). Granular material was noted in some of the nuclei. The cytoplasm was slightly basophilic. The limiting membranes were clearly defined with minimal intercellular fibrous tissue. The tumor cells were arranged in sheaths which were perithelial in some areas and encroached on bone spicules in other areas. A diagnosis of Ewing's tumor was made. A differentiation from reticulum cell sarcoma and neuroblastoma was based on the uniformity of the cell

From Madigan Army Hospital, Tacoma, Wash.

Figure 1. Tumor of the left zygomatic arch.

pattern combined with the growth pattern of the sheaths and the absence of intercellular reticulum, and on the failure of clinical and radiographic examination to disclose any other pathologic lesion. This diagnosis was later confirmed by the Armed Forces Institute of Pathology.

Radiation therapy was begun 3 days after the biopsy. Over a 15-day period, 3,000 roentgen units in air were given to a 7- by 10-cm. field directly overlying the mass, using 200 kilovolts at a distance of 50 cm. through 0.5 mm. copper and 1.0 mm. aluminum filters.

There was a moderate erythematous response to the therapy but regression of the size of the tumor began almost immediately. After 1 month there was no clinical evidence of disease (fig. 4).

Five months after the initial examination there was no clinical evidence of recurrence at the primary site, and no clinical nor radiographic evidence of new lesions elsewhere. A radiograph of the zygomatic arch showed an encouraging regeneration of bone in the contour of a normal arch.

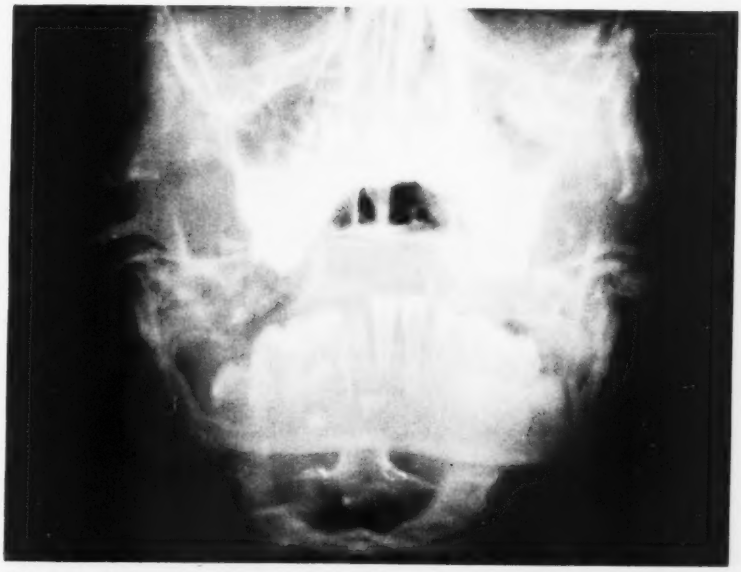

Figure 2. Radiograph showing destructive lesion of the left zygomatic arch.

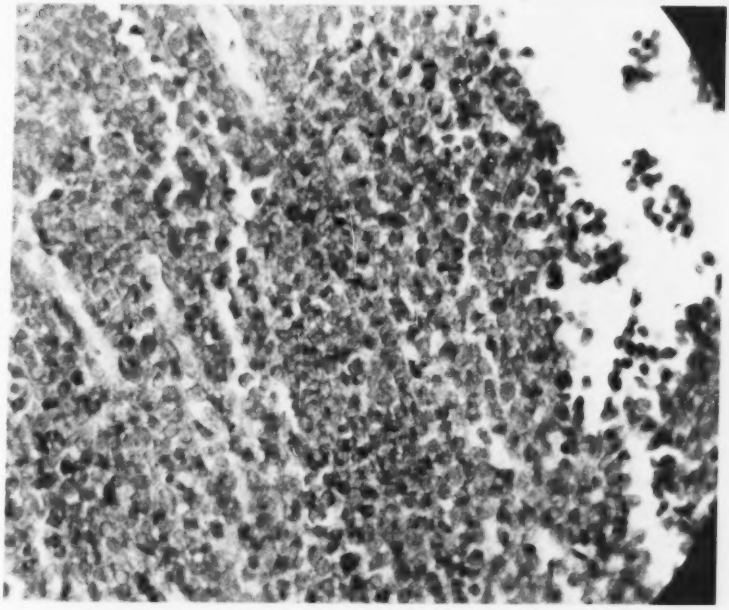

Figure 3. Microscopic section showing the tumor cells. (× 100)

Figure 4. Regression of tumor of the left zygomatic arch one month after beginning radiation therapy.

DISCUSSION

The literature is unanimously gloomy over the results of therapy in Ewing's tumor. Lichtenstein[1] stated that he had personal knowledge of only a single cure. Geschickter and Copeland[2] were among the more optimistic authors, reporting 13 patients well after 5 years in a series of 127. However, even these authors reported no survivors with lesions in the skull or jaws. Their series included 12 patients with lesions of the jaws, 2 of the mastoid, and 1 of the frontal bone.

Our search of the literature at hand disclosed 37 instances of Ewing's tumor primary in the skull or jaws with but 1 apparent survivor. Thoma[3] cited a case from the Registry of Bone Sarcoma, American College of Surgeons, an instance of a 9-year-old girl who was well 9 years following treatment of a jaw tumor by excision and radiation with radium.

Geschickter and Copeland showed that radical operation might offer a better prognosis than radiation therapy alone but, in view of the crippling nature of any such procedure in our patient, radiation seemed to be the treatment of choice.

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THE MODERN EXECUTIVE

It cannot be said that the executive in modern industry is free of the frustrations that contribute to emotional instability in the labor force. He is subject not only to the strains of his demanding job, but also to the hazards of modern competitive society and to the hazards which he brings into his office with him. These latter are probably the most serious of all. They have to do with personality maladjustments, mood disorders, and unconscious motivations patterned in childhood. Like the worker everywhere, the executive brings to the job all his hopes, his fears, his worries, his disappointments, his family troubles—all operating against the background of a changing social panorama. When the executive is emotionally disturbed, there is always a major problem in the organization. This is true not only of the top men, but of people along the entire supervisory echelon who are in charge of other people. It is axiomatic that one badly maladjusted supervisor can cause more trouble in a plant than an epidemic of measles. Strangely enough, this individual rarely recognizes his problem himself and is very much surprised when told about it. Preventive psychiatry in industry must start at the top if it is to be effective.

—FRANCIS J. BRACELAND, M. D.
in *Medical Annals of the District of Columbia,*
p. 220, May 1955

Split-Skin Grafts in Postoperative Denudation of Anal Skin and Mucosa

WALTER J. MEEKINGS, Jr., *Lieutenant (MC) USNR*

THE LOSS of anal skin and mucosa following surgical procedures about the anus is a rarity now because the Whitehead type of hemorrhoidectomy is no longer generally employed. However, the following two case reports are offered because of a very favorable response to a relatively simple type of surgical procedure.

CASE REPORTS

Case 1. A 19-year-old marine was admitted to this hospital on 10 March 1955 for further treatment following a hemorrhoidectomy at an advance base. The only record available is a narrative summary of his hospital course.

On 21 February the patient reported to sick call because of "swelling in his anal region." Tetracaine ointment, warm applications, and mineral oil were prescribed. On 23 February he again reported to sick call and was referred to an activity with more adequate facilities for treating him.

The history at the time of admission revealed painful prolapsed hemorrhoids of six days' duration which had subsided partially on conservative therapy. Positive physical findings were limited to the anal region where, on the left side, there was a painful prolapsed anal papilla with internal and external hemorrhoidal tissue present.

On 26 February hemorrhoidectomy was performed. The next written observation was on 6 March when an observer wrote that the patient "appears to have had a complete circumferential hemorrhoidal excision." The patient was then transferred to this hospital because of the length of time involved in healing and to receive the care necessary to prevent stricture formation.

Examination at this hospital revealed the following: a recent operative procedure on the anus with a circumferential loss of perianal skin about 2½ cm. distal to the dentate line with the greatest proximal mucosal defect 1½ cm. Digital examination was possible with the index finger; however, there was severe induration of the perianal tissues. Sphincter action was present but the patient had noticed signs of an anal incontinence, although he was unaware of the leakage of stool.

From U. S. Naval Hospital, Navy 3923, FPO, San Francisco, Calif.

It was decided to apply split-skin grafts to the anal canal area following dilation under anesthesia. On 12 March he was given 1½ oz. of castor oil, and a liquid diet was prescribed. On 14 March under spinal anesthesia, dilation was performed, resulting in acute fissures at "12 and 6 o'clock." Free hand, split-skin grafts measuring 1 by 2 cm. were taken from the left buttock and placed in the fissures formed by the dilation. These grafts were sutured in place anteriorly and posteriorly with No. 0000 silk. Snug vaseline gauze and pressure dressings were applied.

The patient was kept at rest in bed and on a liquid diet postoperatively. On 16 March it was necessary to remove the dressings because of the appearance of liquid stool. The grafted areas showed about 70 percent take at "6 o'clock" and about 35 percent take at "12 o'clock."

He has been maintained on a regular diet and has been receiving daily instrumental dilation. At the time of discharge to duty on 18 April his anal sphincter tone was excellent. He was asymptomatic and was having normal bowel movements. His anal incontinence was still present to a mild degree. This incontinence is expected to clear spontaneously. The grafts had spread out and the skin and mucosa were completely covered.

Case 2. A 25-year-old marine was admitted to this hospital on 6 March 1955 for further treatment following a Whitehead type procedure for anal verruca acuminata performed at an advance base.

On 8 February he was admitted to the advance base hospital with large friable verruca acuminata protruding from the anus. These were bleeding, tender, and covered the entire anal and perianal area. Treatment with 20 percent suspension of podophyllum resin was attempted but was not successful in effecting complete regression of the lesions.

On 21 February, under spinal anesthesia, the mucosa and verrucae were excised. The remaining mucosa was mobilized and brought out over the anal sphincter and sutured to the perianal skin. On the third postoperative day the mucosa retracted and the patient was transferred for further treatment.

Examination at this hospital revealed a circumferential loss of anal skin and mucosa for about 2½ centimeters. The anal area was very dirty and repeated sitz baths were prescribed. There was beginning cicatrix formation, and anal dilation with the index finger was all the patient could tolerate. Sphincter tone was present but he had an anal incontinence.

It was decided to attempt split-skin grafts to the anal canal. On 12 March he was given 1½ oz. of castor oil, and a liquid diet was prescribed. On 14 March, under spinal anesthesia and with the patient in a jackknife position, the anal canal was dilated, resulting in wide fis-

sures at "6 and 12 o'clock." Free hand, split-skin grafts from the left buttock were applied to the fissures. These grafts were not sutured but were packed in place with vaseline gauze and pressure dressings.

The patient was maintained on a liquid diet and rest in bed during the postoperative period. On 16 March it was necessary to examine the operative site because he had a large watery stool. There was a small amount of "take" at "12 o'clock."

On 17 March, under local anesthesia of 1 percent procaine, a rectal tube was inserted and three quadrant split-skin grafts were applied. Vaseline gauze was packed snugly around the tube and against the grafts.

On 20 March dressings were removed and scattered "takes" were noted around the anal canal. The patient was started on a regular diet and daily dilations. The grafted areas spread out in all directions. At the time of discharge to duty the patient's lesion was healed. Sphincter tone was excellent. There were no signs of stricture. The patient was having regular bowel movements and was asymptomatic except for a slight anal incontinence which he is expected to overcome spontaneously.

LENGTH OF HISTORY IN CARCINOMA OF THE STOMACH

The concept that early diagnosis of carcinoma of the stomach may improve end results is not only fallacious but is in fact the reverse of the truth. Patients with progressively longer periods of delay, from onset of symptoms to the time of exploration, enjoy increasingly better chances of resection and long-term survival. In a review of 375 cases of gastric carcinoma, Swynnerton and Truelove noted that "an outstanding finding of the present study is the marked prognostic significance of length of history among patients treated with surgical resection. The greater the length of history the better the prognosis." Repeated observations of this seeming paradox direct attention to the need for identifying factors other than early diagnosis as the avenues through which survival rates in gastric carcinoma might be improved, if this is possible with present technics.

—IAN MAC DONALD, M. D., and PAUL KOTIN, M. D.
in *Surgery Gynecology and Obstetrics*,
p. 148, Feb. 1954.

Clinicopathologic Conference

U. S. Naval Hospital, Great Lakes, Ill.*

POSTPARTUM SHOCK

Summary of Clinical History. A 35-year-old white woman, gravida I para 0, whose estimated date of confinement was 7 November 1952, was seen in the outpatient clinic of this hospital for the first time on 20 October 1952. At that time she was found to have a blood pressure of 145/102 mm. Hg, but had no edema or albuminuria. A note from her attending physician stated that on 8 August 1952 her blood pressure was 130/80, and on 3 September and 1 October it was 136/80 mm. Hg. Her total weight gain was 30 pounds. She was placed on bed rest, sedation, and a 1,000-calorie low salt diet. A urinalysis was negative for albuminuria, and showed a specific gravity of 1.011. Result of microscopic examination was within normal limits. Her red blood cell count was 4.4 million per cu. mm. and the hemoglobin was 13 grams per 100 ml. She was found to be Rh positive. On this management she began to lose weight, but failed to have a decrease of blood pressure. She felt much better, so was discharged home on sedation 23 October, to be followed closely in the pathologic obstetric clinic.

Examination in the clinic on 3 November 1952 revealed a vertex presentation, at term, with the presenting part not engaged. Although up to this time it was believed that her pelvis gave clinical evidence of being adequate, roentgenographic pelvimetry was deemed advisable and this was requested. Her blood pressure on this visit was 148/98 mm. Hg and she had no albuminuria or edema. On subsequent visits on 10 and 17 November, she was found to have blood pressures of about 140/90 mm. Hg. She had no edema and the urine was free of albumin. Findings of roentgenographic pelvimetry were reported as adequate.

Physical Examination. On 24 November, the blood pressure was 150/100 mm. Hg; mild ankle edema was present. Because of this rising pressure, she was readmitted to this hospital for further

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rest and workup. On admission, the patient was found to have a term intrauterine pregnancy with vertex floating. The head would dip into the pelvis only with difficulty. The fetal heart tones were audible in the left lower quadrant of the abdomen and no audible placental souffle was heard. It appeared that the infant was quite large, yet by vaginal examination the examining physician believed that vaginal delivery was feasible.

Laboratory Findings. Blood chemistry studies were done with these results: Nonprotein nitrogen 25 mg., blood urea nitrogen 13 mg., uric acid 1.8 mg., and creatinine 1.1 mg., all per 100 ml.; total protein, 5.70 (albumin 3.30, globulin 2.40) grams per 100 ml. Other laboratory studies were reported as follows: Red blood cell count, 4 million per cu. mm.; hemoglobin, 12.0 grams per 100 ml.; and hematocrit, 37 percent. The Kahn serologic test for syphilis was negative. Urinalysis was negative for albumin and sugar, and showed a specific gravity of 1.011. Microscopic examination revealed 1 to 2 white blood cells per high power field, with no casts.

Course in Hospital. Immediately on admission, 500 ml. of a 20 percent solution of dextrose containing 2 grams of magnesium sulfate was given intravenously. Daily management consisted of 100 mg. (1½ grains) of phenobarbital intramuscularly three times a day, 1 gram of magnesium sulfate intramuscularly four times a day, and a 1,000 calorie, low salt, high protein diet. An eye consultation revealed normal optical fundi.

The day following admission her blood pressure rose to 170/120 mm. Hg, at which time the intravenous administration of dextrose containing magnesium sulfate was repeated and 120 mg. (2 grains) of phenobarbital sodium were given in addition to phenobarbital. On the following two days (26 and 27 November) her blood pressure began to decrease, falling to 144/90 mm. Hg. At that time a vaginal examination revealed the cervix partially (25 percent) effaced and 1 cm. dilated. Because the head could be made to dip into the pelvis by the Hillis maneuver it was believed that induction of labor was advisable.

The patient was first given 1,000 ml. of a 5 percent aqueous solution of dextrose intravenously, containing 10 minims of pitocin (brand of posterior pituitary). This was begun very slowly (12 to 20 drops per minute) and was effective for the production of contractions every 5 to 7 minutes which lasted 30 seconds. After an hour, the speed of the intravenous drip was increased by changing the rate to 30 drops per minute. This narrowed the interval of contractions and increased their effectiveness. Over a period of three hours the rate was gradually increased, under close observation, to 60 drops per minute, which produced contractions every 2 to 2½ minutes. Her blood pressure remained

fairly stable at 140/90 mm. Hg. By late afternoon, the entire 1,000 ml. of fluid was absorbed and the needle removed. The contractions slowed down and finally ceased. It was decided to allow her to rest for the evening and begin the process of induction by this means again in the morning.

That evening at 2000 hours (28 November) the membranes ruptured spontaneously and she began to note a few irregular contractions. The fetal heart tones were good and it was decided to allow her to remain under observation to see if labor would begin. She fell asleep, but at 0430 hours on 29 November was awakened with uterine contractions occurring every 10 minutes. At 0700 hours she was given a soapsuds enema and transferred to the labor room. At 1000 hours pitocin was started intravenously at the rate of 10 drops per minute. Immediately very hard and regular contractions began at intervals of 5 minutes, soon decreasing to 3, and, finally, to 2 minutes. They were of good quality. At 1245 hours, after 50 ml. of fluid had been given, the intravenous drip was stopped because it was believed that the violence of her contractions contraindicated further stimulation.

The labor progressed well thereafter, with good contractions every 2 to 2½ minutes, for 9 hours until 2200 hours. At that time the pains seemed to decrease in their interval of occurrence and their intensity. A sterile vaginal examination done at 2400 hours revealed the cervix to be about 80 percent effaced and 6 cm. dilated. The vertex was located 1 cm. below the ischial spines and in a left occiput transverse position. Because of the poor quality of contractions and the difficult labor, the patient was given 15 mg. (¼ grain) of morphine sulfate in an attempt to rest her in preparation for further labor.

At 0300 hours she was awakened with strong regular contractions; a sterile vaginal examination revealed the cervix completely effaced and 9 cm. dilated, with the vertex 2 cm. below the ischial spines. At 0945 hours the cervix was completely dilated and delivery deemed advisable. At 1000 hours, she was taken to the delivery room and a saddle block anesthesia of 8 mg. of metycaine (brand of piperocaine hydrochloride) was given. The blood pressure dropped from 150/100 mm. Hg to 130/90 mm. Hg and was stabilized with ½ ml. of ephedrine intramuscularly. A normal, viable 8-pound male infant was delivered by Kielland midforceps rotation from a left occiput transverse position to a left occiput anterior position, and by a Simpson midforceps extraction. A left mediolateral episiotomy was made and repaired without incident. The placenta followed spontaneously with about a 500 ml. loss of blood. The uterus contracted well, but immediately following delivery of the placenta it relaxed momentarily and 1 ampule of pitocin was placed in

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the dextrose, which was already being given intravenously. This resulted in good contraction of the uterus and control of blood loss.

Immediately postpartum the pulse rose to 120 per minute with blood pressure 120/80 mm. Hg. The patient appeared pale. Blood was made available for transfusion. At that time the hemoglobin was 9.5 grams per 100 ml. The pulse continued to be rapid. Two hours after delivery the blood pressure dropped to 80/60 mm. Hg, and 500 ml. of whole blood was started slowly. The pulse had increased to 140 to 160 per minute. The medical watch was called to see her, at which time her blood pressure had risen to 139/92 mm. Hg, with a pulse of 120. The heart was considered to be normal and the lungs were clear. It was believed that her drop in blood pressure had been due to splanchnic vasodilatation. She continued to run a rapid pulse for two more hours, but the blood pressure was stabilized between 100/80 and 130/90 mm. Hg. She was pallid, but seemed to be improving until 1630 hours, when she stopped breathing and artificial respiration was undertaken. Stimulation with coramine (brand of nikethamide) was of no avail, and the patient was pronounced dead at 1630 hours. Oxygen was in use at the time of death, but without effect.

DISCUSSION

Doctor Rubin: This so-called "elderly primipara" presented several problems prior to her actual delivery. On her first admission she had a moderate rise in blood pressure, accompanied by some edema, perhaps enough to be considered a very mild pre-eclampsia. On her second admission, the blood pressure had risen to 150/100 mm. Hg and was accompanied by an increased amount of edema; because of this and the fact that she was believed to be past term, it was considered advisable to effect delivery. Vaginal delivery was in order and accordingly the membranes were stripped and pitocin administered intravenously. The membranes ruptured spontaneously, and when uterine contractions became strong the pitocin was discontinued.

The delivery itself could not be considered truly difficult although a forceps rotation of the head was required to effect delivery after the patient had been in labor for 21 hours. Immediately following delivery the patient's condition seemed satisfactory except for the rapid pulse. The tachycardia persisted, the patient appeared to be going into a state of shock, and her blood pressure began to drop. Search for evidence of external or internal bleeding was done thoroughly and the attendant felt certain the patient was not losing blood; however, something was definitely and seriously wrong because her condition soon became worse.

What are the causes we think of when we are faced with such a situation—a patient showing increasing shock soon after delivery? These causes, of course, can be divided into those which accompany

the puerperal state, and those which are extragenital but in which pregnancy plays the role of a possible exciting factor. In the first group are the hemorrhages seen in ruptured tubal pregnancy, perforation of the uterus by hydatid mole, placenta praevia, abruptio placentae, rupture of the uterus, rupture of utero-ovarian veins, and postpartum hemorrhage due to atony or inversion of the uterus. Also, it is recognized that a state of shock may result in prolonged labor and difficult delivery. There is a third group associated with acute toxemia and cerebral hemorrhage and producing sudden death.

Some "extragenital" causes are cardiac disease, where the strain of labor may rupture the heart, aorta, or cerebral veins, and undiagnosed abscesses or tumors which may rupture during delivery. Sudden death during delivery also has been seen in women with severe sickle cell anemia. Clinically, our patient did not appear to be stricken by any of these conditions.

In the past 10 years, interest has been aroused in "obstetric shock" as apart from the shock of obstetric hemorrhage. In 1941 Steiner and Lushbaugh[1] first reported amniotic fluid embolism. Since then, a great deal has appeared in the literature on this subject, and, quite recently, Schneider[2] distinguished the "obstetric shock" seen in certain cases of abruptio placentae from that in amniotic fluid embolism. In abruptio placentae, we have encountered shock believed caused by the injection into the circulating blood of a certain tissue extract (thromboplastin) which results in widespread intravascular clotting with resultant fibrin emboli from within the circulating blood. In amniotic fluid embolism, on the other hand, the emboli arise from without the circulating blood (amniotic fluid or meconium) and the resultant vascular occlusions are limited to the pulmonary circulation alone.

Both these disorders may bring about a disastrous chain of events in that grave hemorrhage, associated with acute coagulation defect, may result. In fibrin embolism with abruptio placentae, there may occur a fibrinopenia with defibrination from massive intravascular coagulation. In amniotic fluid or meconium embolism the blood may fail to clot, although its fibrinogen is not diminished. Here, experimentally at least, the defect appears brought on by the release of heparin into the general circulation. It is considered possible for both the conditions to result in acute circulatory failure and there may be acute cor pulmonale.

Making a correct clinical diagnosis of amniotic fluid embolism is admittedly difficult. We believe it to be a distinct entity though it is hard to imagine the seemingly slight alterations in the lungs causing the respiratory distress which may, and does, bring on death as it occurred in this case. Our patient failed to show signs of external or internal bleeding, hence we assume (correctly?) that intravascular blood clotting and defibrination did not take place. There was no sudden onset of shock immediately after delivery as might be expected

with uterine inversion, or rupture of a viscus or tumor. The placenta appeared normally implanted and, seemingly, separated easily and at the proper time. Its vessels appeared normal and unruptured. The pre-existent toxemic state did not become aggravated by the labor and delivery, thus ruling out eclampsia. There were no findings to point to sudden cardiac failure or to a cerebrovascular accident. The patient tolerated her anesthetic quite well and did not vomit, therefore probably did not aspirate stomach contents. She was not known to be diabetic and never had glycosuria. She had nothing to point to a venous thrombosis which could give rise to a pulmonary embolism.

This set of circumstances, characterized by the *absence of internal and external bleeding and other catastrophic phenomena,* in a patient who successfully came through a long, tedious labor but fairly atraumatic delivery, focuses our attention on the diagnosis of amniotic fluid embolism. What is the lethal factor in this entity? Is it the occlusion of pulmonary arterioles and alveolar capillaries with infarction, is it a form of anaphylactoid reaction without pulmonary infarction, is it intravascular clotting and afibrinogenemia, or is it some diabolic combination of these factors? We sincerely hope that our colleagues in pathology will before long be able to present us with the correct answer.

In this case, I believe the clinical diagnosis to be amniotic fluid embolism with acute circulatory and respiratory failure.

Dr. Rubin's diagnoses:

1. Amniotic fluid embolism
2. Acute circulatory and respiratory failure

PATHOLOGIC FINDINGS

Doctor Raftery:* The body was that of a well-developed and well-nourished white female, 35 years of age, showing external evidence of recent parturition. The mammary glands showed gestational hypertrophy. The abdominal wall was flaccid and there was a separation of the rectus muscles. The fundus of the uterus was palpable at the level of the umbilicus. There was a recently sutured episiotomy incision in the left posterolateral quadrant of the introitus. Blood clots were present in the vagina. The skin and mucosae were pale. There were no petechiae. The face was somewhat puffy. There was no peripheral edema. The pupils were equal and in midposition. There were no palpable lymph nodes. The body was 60 inches in length and weighed an estimated 130 pounds. Examination of the lower abdomen revealed an enlarged postpartum uterus. There was no excessive fluid or blood present in the peritoneal cavity. The uterine veins were large, very tortuous, and thrombosed. Thrombosis extended into both broad ligaments and along the ovarian veins to the left renal vein and to the inferior vena cava. The lungs were well expanded. Pulmonary

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arteries contained postmortem clot. On cut section the lungs were not remarkable. There were no other significant gross findings.

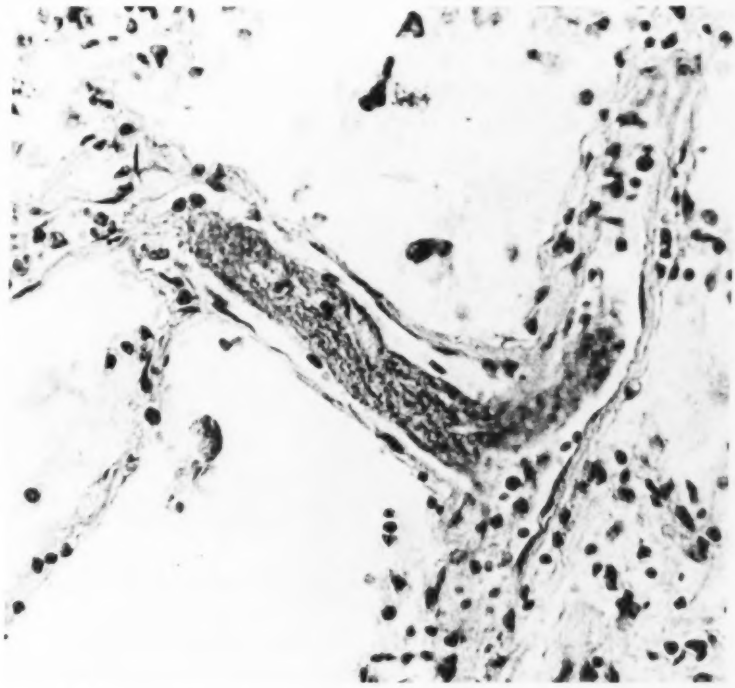

Figure 1. Fibrin embolus occluding a pulmonary capillary. (× 440)

Microscopic examination of the uterine and ovarian veins show an extensive ante-mortem thrombosis. In the material in the central portion of the clot were questionable squamous and desquamated endothelial cells. Microscopic sections of lung showed multiple small fibrin clots occluding many of the pulmonary arterioles and the alveolar capillaries (figs. 1 and 2). Fat stains showed accompanying small amounts of fat associated with these thrombi. Sections of the liver showed a moderate fatty vacuolization of hepatic cells. The periportal spaces were excessively cellular, containing lymphocytes, a few polymorphonuclear leukocytes, and eosinophils. No necrosis was present. Sections of kidneys, ovaries, and uterus showed a rather extensive decidual reaction of connective tissue.

In summary, pathologic examination would indicate that death was due to a widespread occlusion of pulmonary vascular bed by fibrin and fat emboli.

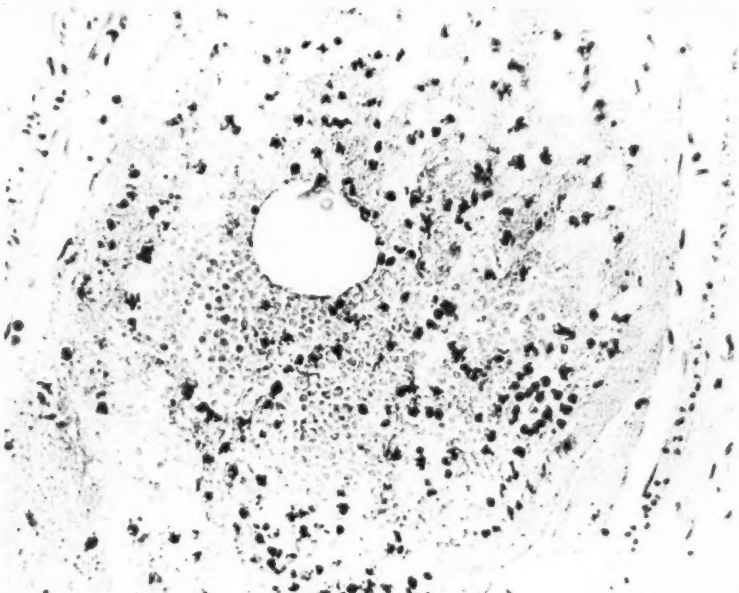

Figure 2. Fibrin clot enmeshing red blood cells, and fat occluding a pulmonary arteriole. (× 220)

Thrombosis in the pulmonary vascular bed is best explained on the basis of expression of amniotic fluid containing thromboplastin into the venous system. The clinical history is consistent with reported cases of amniotic fluid embolism. While there was moderate fatty degeneration of the liver, other anatomic changes of toxemia were not noted. There was no evidence of an acute coagulation deficiency, though this may possibly have existed. Blood studies to rule this out were not done before death, nor was the blood examined immediately after death to ascertain the possibility of this occurrence.

Pathologic diagnosis:

Thrombosis of pulmonary vessels by fibrin and fat emboli (amniotic fluid embolism)

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PROMOTIONS OF OFFICERS

The following officers of the military medical services on active duty in the Army, Navy, and Air Force have recently received *temporary* promotions to the rank indicated.

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John L. Terry, *Capt., USAF*
Harold D. Valentine, *Maj., USAF*
William J. Welch, *Capt., USAF*
Donald H. Wong, *1st Lt., USAF*

Medical Service Corps

Jerry L. Anderson, *1st Lt., USAF*
Gerald J. Armatis, *Capt., USAF*
Herbert C. Barnett, *Maj., USA*
Charles E. Bell, *Maj., USA*
Russell C. Cheek, *Lt. Col., USAF*
Manuel S. Crouch, *1st Lt., USAF*
Gene W. Crowell, *Lt. Col., USAF*
Earl Danka, *Maj., USAF*
Laurence C. Davis, Jr., *1st Lt., USAF*
Leslie Davis, *Capt., USAF*
John V. DeLuca, *Maj., USA*
Henry R. Dick, *Maj., USA*
Charles C. Dills, *Lt. Col., USAF*
George L. Fiocca, *1st Lt., USAF*
Robert W. Gehrig, *1st Lt., USAF*
Neil J. Gittelman, *1st Lt., USAF*
John R. Green, *Capt., USAF*
Joe E. Hunt, Jr., *1st Lt., USAF*
Eugene J. Kamrass, *1st Lt., USAF*
Raymond L. Kent, *Maj., USAF*
Gordon S. Kjolsrud, *Col., USAF*
Robert E. Linder, *Capt., USAF*
James J. Long, *Maj., USA*
William J. Meads, *Maj., USA*
Edward S. Nugent, *Capt., USAF*
John H. Patrick, Jr., *Maj., USAF*
James D. Peterson, *1st Lt., USAF*
James W. Polkinghorn, *Col., USAF*
Thomas E. Powers, *1st Lt., USAF*
William C. Reischman, *Capt., USAF*
Jean D. Rogers, *Capt., USAF*
Edward M. Seright, *1st Lt., USAF*
Olando J. Simpson, *1st Lt., USAF*
John W. Smiddy, *1st Lt., USAF*
Benjamin R. Snyder, Jr., *Capt., USAF*
James T. Steele, *1st Lt., USAF*
Henry O. Wick, Jr., *1st Lt., USAF*
Rolla D. Willard, *Capt., USAF*
Elwood M. Wright, *Col., USA*
William J. Wyatt, *Lt. Col., USA*
Virgil T. Yates, *Lt. Col., USA*
Isacah M. Zimmerman, *1st Lt., USAF*
George Zinnemann, *Lt. Col., USAF*
Harry Zubkoff, *Col., USAF*

Women's Medical Specialist Corps

Mary N. Davenport, *1st Lt., USAF*
Elsie L. Deming, *Capt., USAF*
Martha J. Fortune, *1st Lt., USAF*
Filomena R. Fusco, *Capt., USAF*
Barbara D. Gray, *1st Lt., USAF*
Lelia M. Hendricks, *Maj., USA*
Katharine Leonard, *Maj., USA*
Mary Lipscomb, *Maj., USA*
Josephine C. Lydon, *Maj., USA*
Julia R. Moynihan, *Capt., USAF*
Helen Murphy, *1st Lt., USAF*
Kathleen D. Murphy, *1st Lt., USAF*
Doris L. Northcutt, *Capt., USAF*
Margaret E. Pontzer, *1st Lt., USAF*
Olive J. Potter, *Capt., USAF*
Evelyn G. Summers, *Maj., USA*

The following officers have recently received *permanent* promotions to the rank indicated.

Medical Corps

Curtis P. Artz, *Maj., USA*
James N. Brien, Jr., *Maj., USA*
Angel A. Cardona, *Col., USA*
John E. Edwards, *Maj., USA*
Neil B. Hadley, *Capt., USAF*
Clarence B. Hewitt, *Maj., USA*
Robert C. Koehn, Jr., *Capt., USAF*
Bruce L. Livingstone, *Capt., USA*
George H. McLain, Jr., *Capt., USAF*
Byron L. Miller, *Maj., USA*
John B. Norton, *Capt., USAF*
Charles R. W. Reed, *Maj., USA*
Lewis C. Shellenberger, *Col., USA*
Hal E. Snedden, *Capt., USAF*
Robert G. Thompson, *Lt. Col., USA*
Travis J. Towson, Jr., *Maj., USA*
Charles W. Upp, *Capt., USAF*
William E. Weller, *Capt., USAF*

Dental Corps

Sidney A. Hagen, *Capt., USAF*
Charles J. Mahan, *Capt., USAF*
Edward R. Raskin, *Capt., USAF*
Raymond W. Shaddy, *Capt., USA*
Marsh E. Shumaker, *Maj., USA*
Wayne W. Thornberry, *Maj., USAF*

DEATHS

BAUER, Mary Louise, First Lieutenant, ANC, USAR, Fort Smith, Ark.; 4002 Army Service Unit, Army Hospital, Camp Chaffee, Ark.; graduated in 1951 from the Frankford Hospital School of Nursing, Philadelphia, Pa.; appointed a second lieutenant 2 July 1953; ordered to active duty 8 October 1953; died 6 June 1955, age 25, at Vic Vian, Okla., of injuries received in an automobile accident.

BRANSON, Edward Carl, Captain, MC, USA, Knoxville, Tenn.; assigned to Walter Reed Army Medical Center, Washington, D. C.; graduated in 1947 from the University of Tennessee College of Medicine, Memphis, Tenn.; commissioned a first lieutenant 2 January 1951; died 2 June 1955, age 31, in Clay County, Fla.

GUNTER, Clifford Ellis, First Lieutenant, MSC, USAR, College Park, Ga.; assigned to Headquarters and Service Company, Army Aviation Regiment, Camp Rucker, Ala.; attended the University of Georgia in 1950; appointed a second lieutenant 17 January 1953; ordered to active duty 17 January 1953; died 28 May 1955, age 24, at Panama City Beach, Fla., of accidental drowning.

QUINN, Juanita Alice, Captain, ANC, USAR, Terre Haute, Ind.; 98th General Hospital, Germany; graduated in 1941 from the Methodist Hospital School of Nursing, Indianapolis, Ind.; appointed a second lieutenant 26 January 1943; ordered to active duty 26 January 1943; released from active duty 11 October 1946; recalled to active duty 15 June 1951; died 22 May 1955, age 44, in Germany, of injuries received in an automobile accident.

ROBERTS, Richard Edward, First Lieutenant, MSC, USAR, Johnstown, Pa.; assigned to Cargo Helicopter Company, 3461st Service Unit, Camp Rucker, Ala.; appointed a second lieutenant 28 July 1950; ordered to active duty 26 August 1950; died 20 May 1955, age 32, at the U. S. Army Hospital, Camp Rucker, Ala., of injuries received in an aircraft accident.

NEW CHAIRMAN OF A. M. A. MILITARY MEDICINE SECTION

Outgoing chairman Maj. Gen. I. S. Ravdin, MC, USAR (left) congratulates his successor, Rear Adm. H. Lamont Pugh (MC) USN (right), following election of officers of the Military Medicine Section of the A. M. A.

At the recent American Medical Association meeting in Atlantic City, N. J., Rear Admiral H. Lamont Pugh (MC) USN, former Surgeon General of the Navy, was elected chairman of the Military Medicine Section. Captain Cecil Andrews (MC) USN, Director, Professional Division, Bureau of Medicine and Surgery, was elected secretary. The outgoing officers were Major General I. S. Ravdin, MC, USAR, chairman, and Colonel Charles L. Leedham, MC, USA, secretary.

MEDICAL OFFICER HONORED

Vietnam's President Ngo Dinh Diem awarded the medal "Officier de l'Ordre National de Vietnam" to Thomas A. Dooley, Lieutenant (jg) (MC) USN, for his outstanding work in refugee camps in Northern Vietnam, at the Presidential Palace in Saigon on 12 May 1955.

Lt. (jg) Thomas A. Dooley (MC) USN recently received the medal "Officier de l'Ordre National de Vietnam" award from Vietnam's President Ngo Dinh Diem at the Presidential Palace. At the ceremony with Dooley are, from left to right: Capt. Walter C. Winn, USN, Commander of the Indo China Evacuation Forces; Father Khue, Vietnamese Catholic priest; and Maj. Nathan R. Smith, USMC, a member of Capt. Winn's staff.

Early in September 1954 an additional medical officer was needed in the Navy's Preventive Medicine and Sanitation Unit at the refugee camp and embarkation sites in Haiphong. Dr. Dooley, then serving as medical officer of the U. S. S. *Montague*, volunteered for this duty. He was made Officer in Charge of the unit on 24 October 1954 and continued as such until the completion of operation "Passage to Freedom" on 19 May.

Lieutenant Dooley was one of the few Americans who served in Vietnam throughout the entire period of the Navy's evacuation, called "Passage to Freedom." The operation carried a total of 310,848 people and involved more than 100 naval ships and commands. It began in August 1954 and ended when the "Bamboo Curtain" descended and the Vietminh Communist forces of Ho Chi Minh occupied Haiphong and the rich Tonkin delta.

OFFICIAL DECORATIONS

LEGION OF MERIT

Leo J. Geppert, *Lt. Col., MC, USA*
Joseph J. Gulyash, *Lt. Col., USAF (MC)*
James T. Johnson, *Col., USAF (MSC)*
Allan B. Ramsay, *Col., MC, USA*

NAVY AND MARINE CORPS MEDAL

James E. Stark, *Lt. (MC) USN*

BRONZE STAR MEDAL

Joseph C. Bamet, *1st Lt., MC, USA*
Stanis P. Carney, *Lt. Col., MSC, USA*
Milton Cohen, *Maj., MSC, USA*
William E. Froemming, *Maj., MC, USA*
Lee B. Grant, *Lt. Col., MC, USA*
James L. Hansen, *Lt. Col., MC, USA**
Freeman C. Harris, *Capt. (MC) USN*
Helen M. Heinrich, *Maj., ANC, USA*
Tomas C. Jefferis, *Lt. Col., MSC, USA*
Daniel W. Nicholson, *1st Lt., MSC, USA*
Robert O. Quackenbush, *Maj., MSC, USA*
Keith O. Shafer, *Capt., MSC, USA*

COMMENDATION RIBBON

Nathaniel E. Adamson, Jr., *Lt. (MC) USNR*
Harold J. Antonides, *1st Lt., MC, USA*
Roscoe K. Balch, *Capt., USAF (VC)*
Margarita E. Breton, *Capt., ANC, USA*
George E. Brown, *1st Lt., MSC, USA**
McKinley P. Cassada, *Capt., USAF (MSC)*
Margaret A. Cassidy, *Capt., ANC, USA*
Evelyn M. Christie, *Capt., ANC, USA*
Floyd H. Crain, *2d Lt., MSC, USA*
Doris K. Davis, *1st Lt., ANC, USA*
Norman R. Davis, *Maj., MC, USA*
Louise Dieter, *Capt., ANC, USA*
Evelyn C. Ekstrom, *Capt., ANC, USA*
Iladene H. Filer, *Capt., ANC, USA*
John L. Finn, *1st Lt., MSC, USA*
James B. Fisher, *1st Lt., MSC, USA*
Lyman P. Frick, *Maj., MSC, USA*
Park W. Gloyd, *Capt., MC, USA*
Leon D. Graybill, *Maj., MC, USA*
Julia E. Hambrick, *Capt., ANC, USA*
Jimmy L. Hatfield, *1st Lt., MSC, USA*
Byron P. Howlett, Jr., *1st Lt., MSC, USA*
Edward J. Jaruszewski, *Comdr. (MC) USN*
Wanda Jensen, *Maj., ANC, USA*
Loraine D. Johnson, *Capt., ANC, USA*
Earl M. Jung, *Maj., USAF (MSC)*
Caroline A. Kelcec, *Lt. (NC) USNR*
Richard A. Kern, *Rear Adm. (MC) USNR*
Clifford W. Knieriem, *Capt., MSC, USA*
Mary D. Kokol, *Maj., ANC, USA*
Sherman F. Kramer, *1st Lt., MSC, USA*
Eunice M. LeBlanc, *1st Lt., ANC, USA*
James W. Ledwith, *Lt. (jg) (MC) USNR*
Irvin B. Lindsey, *Maj., MSC, USA*
Edward Y. Lovelace, Jr., *Maj., DC, USA*
Melvin M. Marcus, *1st Lt., MC, USA*
Ivan M. Marquez, *Capt., MC, USA*
Ellayne E. McAlpine, *Maj., ANC, USA*
William A. Meriwether, *Capt., MC, USA*
Alvin F. Meyer, Jr., *Lt. Col., USAF (MSC)*
Martha P. Miller, *1st Lt., ANC, USA*
Charles S. Mullin, *Comdr. (MC) USN*
John M. Myers, *Maj., DC, USA*
Bernice C. Nielsen, *Capt., ANC, USA*
Clyde W. Norman, *Comdr. (MC) USN*
Robert J. Oakes, *Capt., USAF (MC)*
Carl Pace, *1st Lt., MSC, USA*
Herman S. Parish, *Maj., USAF (MC)*
Margaret L. Pheil, *1st Lt., ANC, USA*
Robert D. Pickett, *Capt., USAF (MC)*
Alwin T. Potter, *Lt. Col. DC, USA*
Lucille M. Riggs, *Capt., ANC, USA*
Mary M. Robertson, *Capt., ANC, USA*
Kathryn A. Schmidhamer, *Capt., ANC, USA*
Charles B. Smith, *Maj., MC, USA*
Lila D. Soto, *Capt., ANC, USA*
Leo A. Stapleton, *1st Lt., MC, USA*
Elizabeth A. Thompson, *Capt., ANC, USA*
Flora Tulin, *Lt. (NC) USN*
Genevieve S. Walk, *Maj., ANC, USA*
Edgar D. Wipperman, *Maj., USAF (MC)*
Joseph L. Yon, *Capt. (MC) USN*

*Oak Leaf Cluster.

The names of officers of the medical services who have been awarded decorations by the United States Army, Navy, or Air Force are published in this department following receipt of information from official sources.—*Editor.*

NEW DIRECTOR OF ARMED FORCES INSTITUTE OF PATHOLOGY

Captain William M. Silliphant (MC) USN, has been appointed The Director, Armed Forces Institute of Pathology. The 54-year-old veteran Navy pathologist succeeds Brigadier General Elbert DeCoursey, MC, USA, whose tour of duty ends on 1 August. General DeCoursey will become Commandant of the Medical Field Service School at Brooke Army Medical Center, San Antonio, Tex.

Captain Silliphant, Deputy Director of the AFIP since February 1952, received his medical degree from Stanford University Medical School in 1931. He was commissioned in the Medical Corps of the Navy in 1930.

Assigned to the U. S. Naval Hospital, Canacao, Philippine Islands, 1 month before the Japanese began their conquest of those islands, he was captured and interned by the Japanese for 37 months. On the staff of Bilibid Prison Hospital for Allied Prisoners of War, he served simultaneously as Ward Medical Officer, Sanitation Officer, and Laboratory Officer. For distinguished service while a prisoner of war, the Secretary of the Navy issued him the Navy Letter of Commendation with Commendation Ribbon. For 5 years he served as Director of Laboratories and Executive Officer of the National Naval Medical Center, Bethesda, Md.

Reviews of Recent Books

DISEASES OF THE SKIN, by *George Clinton Andrews*, M. D. 4th edition. 877 pages; with 777 illustrations. W. B. Saunders Co., Philadelphia, Pa. 1954.

This long-accepted standard textbook has been popular with medical students because of its wide encompassment of the field with a minimum of extraneous material. The author has carried on the policies of textual writing which were characteristic of his previous editions; namely, readability, conciseness of description and therapy, and avoidance of controversial discussion. The entire text has been carefully scrutinized and reorganized. Amongst the many new disease entities described are cutaneous porphyria, eosinophilic granuloma of the skin, cat scratch disease, acrodermatitis enteropathica, lipoatrophia annularis, retrolental fibroplasia as regards its concomitant dermatological aspects, keratoacanthoma, calcifying epithelioma, and malignant granuloma of the face.

Weak points are difficult to find in this publication. There is still an inadequate discussion of mycology, however, a lack of detailed histopathologic description for many conditions, an occasional slip in failure of inclusion of therapeutic regimens (or statement to the effect that none is of any value), and occasional exclusion of more widespread opinion than that held by the author. Especially strong points, other than those previously mentioned, are the chapters on roentgen-ray and radium therapy, collagen diseases, and the chapters on tumors. A more conservative recommendation of nonspecific use of roentgen-rays in therapy is noteworthy and commendable as well as is a conservative attitude toward steroid therapy.

This revision is a welcomed event for every student and practitioner interested in diseases of the skin. The volume is well illustrated, and has an adequate index and bibliography.

—*VICTOR R. HIRSCHMANN, Col., MC, USA*

FLUID AND ELECTROLYTES IN PRACTICE, by *Harry Statland*, M. D. 206 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $5.

This volume is refreshingly simple and understandable. Students of other treatises on fluid balance will enjoy Dr. Statland's style. Written primarily for those who need it most, clinicians and practitioners who have long been away from basic sciences, it is detailed and comprehensive.

The first section of the book is devoted to an explanation of the general principles of fluid and electrolyte movements, acid-base balance, and problems of the surgical patient. The second section deals

with more specific disorders: heart disease, kidney and urologic diseases, diabetic acidosis, pediatric fluid balance, burns, ascites, and toxemias of pregnancy. There are adequate illustrative drawings to augment the text. The bibliography is adequate, recent, and classified.

Emphasis is on the clinical approach. The importance of the history and physical examination in evaluating the fluid and electrolyte imbalances is stressed, and the author makes it clear that even the absence of a laboratory often does not prevent the physician from reasonable fluid and electrolyte management. By the use of a simple conversion slide rule antiquated laboratory reports can be quickly converted from "milligrams percent" to milliequivalents.

This is such a lucid, well-written, and easily read book that enthusiastic reception by students, practitioners, and specialists is predicted. It is highly recommended for all physicians concerned with patient management.—*RUFUS J. PEARSON, Jr., Comdr. (MC) USN*

INTRODUCTION TO SURGERY, by *Virginia Kneeland Frantz,* M. D., and *Harold Dortic Harvey,* M. D. 3d edition. 233 pages. Oxford University Press, New York, N. Y., 1954. Price $4.

This handy little volume originated from the introductory course in second year surgery at the College of Physicians and Surgeons of Columbia University. It is necessarily elementary and basic but approaches the subject from the viewpoint of pathologic physiology and pathogenesis. It is concerned largely with injury, inflammation, growth, and repair as observed in surgical lesions. The book has been brought up to date and contains various references to surgical results noted in the conflict in Korea. Toward the end there are comments on technic, anesthesia, and experimental surgery, and notes on history taking and the physical examination. The index is adequate and the bibliography of 50 references is in keeping with the synoptic character of the work. This is a valuable pocket reference for beginning students of surgery and a good refresher for those more advanced.

—*WARNER F. BOWERS, Col., MC, USA*

SEROLOGICAL APPROACHES TO STUDIES OF PROTEIN STRUCTURE AND METABOLISM, edited by *William H. Cole.* 97 pages; illustrated. Rutgers University Press, New Brunswick, N. J., 1954. Price $2.

This small volume is composed of the six presentations at the Tenth Annual Conference on Protein Metabolism sponsored by the Rutgers University Bureau of Biological Research in January 1954. They are principally concerned with the precipitin reaction and its nature and use in the study of protein structure. Because of the eminence of the several contributors and the currency of the material presented, this collection of papers will be of great interest to immunologists and immunochemists, and to workers in related fields of research. They will be of less interest to the clinician since it was not the intent of this meeting to consider the clinical applications of serologic technics based upon the precipitin reaction.

The presentation of the material is much enhanced by the judicious use of graphs, photographs, and schematic representations which are well printed and are situated within easy reach of the portions of the text to which they refer.—*THADDEUS J. DOMANSKI, Lt. Col., USAF (MSC)*

MANUAL OF HAND INJURIES, by *H. Minor Nichols*, M. D. 352 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $9.50.

During the 1954 clinical congress of the American College of Surgeons, an interesting discussion centered on the lack of proper treatment of injuries in the receiving wards of hospitals. Among the most common injuries treated in receiving wards are those involving the hand. This book makes available, in one concise volume, the principles of treatment of the multiform injuries and infections of the hand. Use of the information presented would help remedy the failure mentioned above.

The author describes in concise form the relation of anatomy, physiology, and pathology to the ultimate results in well-planned clinical surgery. He stresses, like so many of his colleagues, aseptic, atraumatic surgical procedures in operations on the hands. The chapter on skin grafting is interesting and instructive. Readers are cautioned about undertaking complicated reconstructive procedures unless they are trained in this type of operation. The anatomic plates and illustrations are clear, and the photographs of pertinent cases are useful in diagnosis and treatment.

A copy of this book would be useful in every dispensary, ship, or station medical library to serve as a handbook on hand injuries.

—*SHAKEEB EDE, Capt. (MC) USN*

COMPARATIVE ANATOMY OF THE VERTEBRATES, by *George C. Kent, Jr.* 530 pages; illustrated. The Blakiston Co., Inc., New York, N. Y., 1954. Price $6.

The fundamental similarity in the basic structural plan of all vertebrates, in spite of great variation in form, is so well brought out in this excellent new text of comparative anatomy as to stimulate interest in the evolutionary processes responsible. Emphasis is placed on the resemblances rather than the differences, both between extinct forms and living forms, and between representative members of the 49,000 species now extant.

Introductory chapters, in addition to discussing the protochordates, describe the general characteristics of vertebrates and the uniformity of their early developmental processes. Chapter 3, which extensively surveys the classes of vertebrates with discussion of phylogenetic relationships and mechanics of evolution, is particularly well done, although it would be strengthened by inclusion of the taxonomic classification now appended at the end of the book. The various organ systems are dealt with in detail in 12 succeeding chapters, with considerable attention to osteology,

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The numerous illustrations are satisfactory. A concise summary, sure to be popular with students, is provided at the end of each chapter. Although no references are given, there is a well-chosen list of "Selected Readings" preceding the index.

This volume is well organized, clearly written, and certain to achieve a firm position in the family of textbooks on comparative anatomy.

—*BENNETT F. AVERY, Capt. (MC) USN*

THE ABNORMAL PNEUMOENCEPHALOGRAM, by *Leo M. Davidoff*, M. D., and *Bernard S. Epstein*, M. D. 2d edition. 518 pages, thoroughly revised, with 696 illustrations on 291 figures. Lea & Febiger, Philadelphia, Pa., 1955. Price $15.

The second edition of this excellent work is identical for the most part with the first edition published in 1950; however, significant differences which make it a better book are important additions to the chapters on tumors of the posterior cranial fossa, chronic subdural hematoma, and cerebral atrophy. The bibliography has been enlarged and errors in the text of the first edition have been corrected.

The text includes a discussion of all lesions and diseases capable of producing significant changes in the pneumoencephalogram. Part I, concerning tumors of the brain, includes a short but excellent chapter on the pathology of brain tumors. True neoplasms are discussed in the first section. The second section deals with non-neoplastic tumors and includes chapters devoted to the discussion of chronic subdural hematoma, brain abscess, syphilis of the brain, vascular anomalies, intracranial aneurysms, and cerebral hemorrhage and thrombosis. Part II, consisting of 11 chapters, is entitled "Nontumorous Lesions of the Brain." The text is supported and amplified by many detailed case histories and numerous illustrations of excellent quality.

This volume, together with an earlier volume, *The Normal Encephalogram*, by Cornelius G. Dyke and Leo M. Davidoff, should be considered must reading by students and residents in radiology, neurology, and neurosurgery. *The Abnormal Pneumoencephalogram* is an authoritative reference book for the more experienced practitioner of radiology, neurology, neurosurgery, and pathology.

—*ELMER A. LODMELL, Col., MC, USA*

DISEASES TRANSMITTED FROM ANIMALS TO MAN, by *Thomas G. Hull*, Ph. D. 4th edition. 717 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $12.50.

This revision of a well-known text has been expanded 25 percent over the previous edition (1947) and the number of contributors increased from 15 to 26. The book is concisely written in an easily readable format; the profuse black and white illustrations, tables, and figures are generally clear and, with the exception of the microphotographs, helpful in interpretation of the text. Reference data at the end of many chapters are voluminous and useful.

The work is especially suitable as a basic text for medical and veterinary students and as a comprehensive reference manual for the practicing public health worker, physician, and veterinarian. It is also of value to the military preventive medicine officer, because it contains data on a number of exotic diseases rarely described so succinctly in one volume. A relative emphasis on certain animal diseases (vibriosis, Newcastle's disease, glanders) which are occasionally found in humans in frequent contact with animals indicates that the book is written primarily for the veterinarian.

The weakest portions of the work are those which might well be of the most general interest, *i. e.*, the section on the relation of human and animal diseases, and chapter 22, "Infections Produced by Animal Parasites." In these a number of important diseases such as hydatid disease, African trypanosomiasis, and the trematode diseases transmitted by animals are only briefly mentioned. One wishes the authors had discussed in more detail the ecology and epidemiology of all the diseases described, because the book is eminently suitable for such discussion. Therapeutic measures against well-known diseases have been wisely minimized or omitted, such information being readily available from other standard texts. Excellent summary tables which classify diseases transmissible to man from animals are included at the end of the book.—*PHILIP R. BECKJORD, Lt. Col., MC, USA*

WORLD-ATLAS OF EPIDEMIC DISEASES, First of four issues of Part II, edited by Professor Dr. med. *Ernst Rodenwaldt*, under the Sponsorship of the Heidelberger Akademie Der Wissenschaften. 168 pages; 10 colored maps. Falk-Verlag, Hamburg, Germany, 1954. Price 40 Deutsche marks, plus extra charge for postage and packing.

Geographic studies concerning the epidemiology of world diseases are accumulating regularly and with commendable speed. The second part of this original atlas contains both a continuation of the studies of certain previously reported diseases geographically, and new clinical entities. The extension of dysentery, sleeping sickness, and trachoma studies to the African continent; relapsing fever, with particular reference to the 1920 epidemic in Russia; and the distribution of smallpox in Europe up to 1948 make new and fascinating reading. More recent data on animal and human rabies in central Europe include cases through 1953. Coxsackie virus infection in Europe, including Scandinavia, has been added to the earlier observations. A new venture into the North and South American continents, the first studies in these areas, concerns the vectors and the human incidence of Chagas' disease.

The descriptions of the diseases in both German and English are well written and clearly expressed. The excellent maps are of the same caliber as those in the first part. Also included is a new population density map of the United States. All the descriptive sections and the maps are arranged so that they are inserted into the original loose-leaf binder.—*GOTTLIEB L. ORTH, Col., MC, USA*

LIVER INJURY, edited by *F. W. Hoffbauer,* M. D. 231 pages; illustrated. Sponsored by the Josiah Macy, Jr. Foundation, New York, N. Y. Price $4.25.

The program of this conference report precludes the isolation of the several branches of science from one another and thereby encourages the exchange of methods, research plans, concepts, and difficulties. Without formal speech making the full participation is conducive to communication and cross-fertilization of ideas. Informality and tempo has been preserved in the published transactions in order to share with investigators and students an insight into scientific minds exhibiting mutual interest, respect, trust, and co-operation.

Guest participants (Lundsgaard, Gurin, Kosterlitz) introduce three seminars on the liver and carbohydrate, fat, and protein metabolism, respectively. The experiences gained in their laboratories stimulate critical discussion and informal group interchange. The fourth seminar on cardiovascular lesions in choline-deficient rats relates the experiments of Hartroft and Wilgram which stemmed from studies on the liver in choline deficiency. The 20 participants represent all the significant branches of science related to the problem of liver injury. Each has achieved the unqualified status of an authority in the field of medicine or closely related disciplines.

Although the format of objectives, methods, results, and summary is lacking, each paper includes a bibliography and is illustrated with graphs, charts, and microphotographs. The index is cumulative from 1949 until this twelfth and final annual conference on liver injury. Thus, this volume completes a series which may serve as a reference and stimulus.

The average clinician will find the volume understandable but should not expect to reach ready conclusions and summarizations.

—*JACK C. SHRADER, Lt. Col., USAF (MC)*

THE YEAR BOOK OF THE EYE, EAR, NOSE AND THROAT (1954-1955 Year Book Series), edited by *Derrick Vail,* M. D., and *John R. Lindsay,* M. D. 461 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $6.

The Year Book of 1954-1955 contains abstracts of articles published during 1954. It is divided into three sections: Ophthalmology, 243 pages; otorhinolaryngology, 97 pages; and rhinolaryngology, 101 pages. The abstracts, carefully chosen by outstanding specialists in the field, are for the most part, practical and interesting to the specialist. The editorial comment on many of the controversial articles adds much to the value of the book. The subject index is especially complete for such a large volume of articles.

This Year Book can be recommended as a helpful aid in reviewing the constantly increasing number of articles in the fields of ophthalmology and otorhinolaryngology.—*SHIRLEY A. FUHRING, Capt. (MC) USN*

LABORATORY MANUAL OF BIOCHEMISTRY, by *Benjamin Harrow, Ernest Borek, Abraham Mazur, Gilbert C. H. Stone,* and *Harry Wagreich.* 4th edition. 164 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955. Price $3.

The latest revision of this manual provides a choice and range of learning experiences which are consistent with the needs of the pre-medical and medical student. On this score one is impressed with the frequent but judicious dependence upon the better-known clinical laboratory procedures. It would appear, too, that this laboratory manual could be effectively employed in conjunction with any of the standard biochemistry texts.

About one third of the book (51 pages) is devoted to blood chemistry, this chapter being a compendium of tested procedures widely employed in clinical chemistry. One would be hard pressed to find or to construct a more efficient compilation of such procedures. The chapter on colorimetry includes a functional treatment of the Duboscq colorimeter, filter photometers, and spectrophotometers. The chapters devoted to carbohydrates, lipids, and proteins include the standard tests, plus an introduction to the technics of polarimetry and chromatography. The chapter on enzymes includes an exercise in tissue respiration measurements. Each of these special procedures is preceded by a brief explanation of the principles concerned.

Directions for the preparation of qualitative reagents are placed in the appendix. This arrangement promotes the attainment of a strikingly unhampered statement of the separate procedures. Figures are largely confined to diagrammatic representations of equipment which might be expected to be unfamiliar to the college senior; *e. g.,* Van Slyke manometric apparatus, Warburg equipment, and micro-Kjeldahl assembly. The student will appreciate the use of sturdy metal rings in place of the more conventional bindings, which allows the opened book to lie flat on the laboratory table. This binding also permits the alternate exposure of single pages.—*THADDEUS J. DOMANSKI, Lt. Col., USAF (MSC)*

THE STORY OF DENTISTRY . . . by *M. D. K. Bremner,* D. D. S. Revised 3d edition. 462 pages. Dental Items of Interest Publishing Co., Inc., Brooklyn, N. Y., 1954.

This volume is a compilation of materials about dentistry and allied fields first published in 1939. According to the author, the volume was written because the "facts must be taken from the libraries and brought to the market place." The success of his effort is attested by the publication of a third and enlarged edition.

Presented in a highly readable and entertaining manner, the history manages nevertheless to convey considerable factual material. Not a source book in the strict sense of the word, it does, however, present a sustained narrative of the progressive development of dentistry. The human interest stories included liven the narrative.

Topics discussed range from the purely professional aspects of dentistry to the more mundane considerations of financial factors and specialized training facilities. There is reading of interest to a wide audience. This reviewer was particularly interested in such topics as those which analyzed and discussed the effect of the inventions of vulcanite and the dental engine, for information of this type is not often brought so attractively to the lay reader. Members of the profession, familiar with such knowledge, will find greater value, perhaps, in such topics as the account of Taggart *vs.* the Dentists' Alliance and defeat of the Taggart patents. Moreover, the dentist confronted with the need to make speeches before public gatherings will find this volume a handy reference to provide illustrative material.

—*MAE M. LINK, Ph. D.*

PSYCHOSURGERY AND THE SELF, by *Mary Frances Robinson,* Ph. D., and *Walter Freeman,* M. D., Ph. D. 118 pages. Grune & Stratton, Inc., New York, N. Y., 1954. Price $3.

Except for one chapter written by Dr. Freeman, which is a somewhat technical and descriptive review of developments in psychosurgery, this work is primarily concerned with the psychologic appraisal of the postlobotomy personality. Chapters are devoted to an examination of previous psychologic studies; glimpses of the postlobotomy personalities, consisting of generalizations developed from the senior author's observations and followed by a hypothesis of "self-continuity" which attempts to explain the nature of the alterations in the "self-concept" produced by psychosurgery. Others are devoted to the appraisal of this hypothesis by the introduction of the "Robinson-Freeman Tests of Self-Continuity" which the authors caution "were developed for research purposes only." These tests are individually called "The Self-Regarding Span Test" and the "Sensibility Questionnaire." Both are presented in the appendix, together with the method for administration.

The study around which the book is written consists of 51 prefrontal lobotomy patients who served as the experimental group and who were matched with 17 nonlobotomized patients in regard to age, diagnosis, and length of illness. The latter had improved without psychosurgery. Test differences between the groups were found to be highly significant in the expected direction. Two subjects with intractable pain were also given the test pre- and post-operatively with results that seemed to support the hypothesis. An evaluation of this experiment is difficult because of a number of factors, among which are the small number of controls, the unconventional manner of their selection, the lack of cross-validation data, and the fact that patients considered "unimproved" were excluded from the study. It seems to this reviewer that what is offered in this book could better have appeared in condensed form in one of the professional journals. As an article it would have been excellent—as a book it seems to leave too many questions unanswered.

The authors are to be commended on their clear and effective use of language, for providing a model for interdisciplinary research, for calling attention to the rich potential in psychologic research offered by psychosurgery, and for their excellent bibliography consisting of 179 entries.—*THEODORE C. KAHN, Maj., USAF (MSC)*

THE STUDY OF THE BRAIN, by *Hyman S. Rubinstein*, M. D., Ph. D. 209 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1953. Price $9.50.

In a straightforward manner, and by a popular functional approach, the author succeeds in presenting a brief, well-organized account of the anatomy of the brain and spinal cord. This should help not only the medical student but also those who wish to specialize in neurology and psychiatry. The text is designed as a companion to the author's stereoscopic atlas. The inclusion of significant plates from this atlas as well as drawings of transverse sections of the spinal cord and brain stem in this book, however, makes it complete in itself. The drawings are exceptionally well labeled.

There are 18 chapters, the first few devoted to dissection and general survey of the brain, a welcome and well-timed emphasis. The remaining chapters for the most part describe the various functional systems. The author's concise style of presentation is illustrated in the last three chapters which are related to the cerebellar system, extrapyramidal system, and the hypothalamus. The index is adequate and the bibliography comprehensive.

This book should be of particular value to those who are interested in gaining a fairly detailed and well synthesized concept of neuroanatomy. It also readily lends itself to a fast review of the subject.

—*ARTHUR J. LEVENS, Lt. Col., MC, USA*

CIBA FOUNDATION SYMPOSIUM ON HYPERTENSION: HUMORAL AND NEUROGENIC FACTORS, edited by *G. E. W. Wolstenholme*, M. B., B. Ch., and *Margaret P. Cameron*, M. A. 294 pages; 73 illustrations. Little, Brown and Co., Boston, Mass., 1954. Price $6.75.

This book is an excellent reminder of our ignorance concerning the clinical entity of essential hypertension. It raises many old questions such as how can hypertension be defined, and how does hypertension experimentally produced in animals relate to the human disease. The symposium does not provide the complete answers. Many new problems are discussed. These include the persistence of hypertension even after removal of pheochromocytoma and the return of the epinephrine and norepinephrine excretion to normal; and the question as to whether high blood pressure is an essential part of the hypertensive disease process.

The book is a must for anyone engaged in hypertension research. It also belongs in all medical school libraries. The book is not for the medical school student and general practitioner, and is of little value to the busy internist who is not keenly interested in this important research field. —*MAURICE C. DAVIDSON, Col., MC, USA*

SURGICAL TECHNIGRAMS, by *F. M. Al Akl*, M. D. 341 pages; illustrated. McGraw-Hill Book Co., Inc., New York, N. Y., 1954. Price $12.

This book contains a series of excellent drawings depicting the surgical anatomy and technic of over 30 commonly performed operations with a set of concise explanatory notes of each step illustrated and more complete notes at the end of each procedure. The medical student, intern, beginning surgical resident, and general practitioner will find this book a valuable reference and quick review of the surgical anatomy and technic of the operations illustrated. The more advanced surgeon will find the illustrations interesting and admirable in their simplicity and completeness, but will not be intrigued by the complexity of the problems illustrated.

The operations listed are standard and proper with some exceptions: the first method shown for repairing femoral hernias is somewhat outmoded because most surgeons now use the supra-inguinal approach and Cooper ligament repair. The appendectomy illustrated is more elaborate than necessary; simple ligation and amputation of the appendix with cauterization and without inversion or burial of the stump has proved to be sufficient. In the uterine suspension illustrated, suture of the uterosacral ligaments behind the cervix, believed to be an important part of this operation, has been neglected. Supracervical hysterectomy should be mentioned only to be condemned in the average patient. If hysterectomy is to be undertaken, a complete hysterectomy should be done to avoid carcinoma in the cervical stump. Varicocelectomy is an operation of rare and doubtful value because most varicoceles will subside with conservative treatment or, at least, a higher amputation above the inguinal ring is a better operation. Finally, mere high ligation of the saphenous veins for varicosities without concomitant stripping of the saphenous systems is insufficient.—*CLINTON S. LYTER, Col., MC, USA*

HYPEROSTOSIS CRANII, by *Sherwood Moore*, M. D. 226 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $10.50.

This book is an extensive monograph on hyperostosis of the skull. According to the morphology of the thickened bones and the areas of the skull involved the author classifies them into four types. The best known of these types is hyperostosis frontalis interna.

The subject is approached from the radiographic aspect, cases being collected by review of film of over 10,000 patients. Measurements of the size and thickness of the skulls were made from the films, and similar measurements were made on a number of dried museum specimens and radiographs of these specimens. The data so derived are given in tabular and graphic form. Attempt is made to establish norms for skull measurement.

A large part of the book is devoted to clinical aspects of hyperostosis cranii. The hospital records of over 500 patients with this condition and, for control, charts of a larger number of patients without hyper-

ostosis cranii were reviewed, and tabulation and analysis of general and neuropsychiatric findings were made. The results are presented in tables and graphs. Etiology, pathology, and morphogenesis are discussed at length. Possible relationship of the condition to various endocrine disorders is discussed in particular detail.

The book is divided into 20 chapters, plus two appendixes and seven preliminary sections. There is considerable overlap in the content of these subdivisions. There are a number of typographical errors and grammatically incomplete sentences, some of then seriously distracting from the sense of the statements in which they occur. Cross references are given by chapter only, necessitating a search for the reference. Some of the author's conclusions contradict previous statements. Reproductions of radiographs are good to excellent. The numerical data, particularly that derived from the clinical charts, is somewhat difficult to correlate and digest due to the manner of presentation. In spite of these defects, the book presents a great deal of factual material, and there are many interesting speculations and theories in regard to hyperostosis cranii. It will serve as a source of information for those interested in hyperostosis of the skull.

—LONGSTREET C. HAMILTON, Lt. Col., MC, USA

THE ANATOMY OF THE BRONCHIAL TREE, by *R. C. Brock*, M. S. 2d edition. 243 pages; illustrated. Oxford University Press, New York, N. Y., 1954. Price $11.

A monograph on the details of segmental anatomy of the lung could come from no more qualified observer than Mr. Brock, and publication of such a book at this time is in keeping with the increased interest that has been accorded thoracic surgery since the late war. The material comprising this book is derived primarily from the extensive study and clinical experience of the author at Guy's and Brompton hospitals in London, and it therefore assumes a practical value not true of the older anatomic concepts of the lung. Here is anatomy for every-day use, designed to improve diagnostic acumen and therapeutic accuracy in treating patients with pulmonary lesions.

The introductory chapter is devoted to the international nomenclature applicable to the bronchopulmonary segments. Adequate space is devoted to discussion of the role of bronchial embolism and posture in particular relation to lung abscess; this is basic information and is applicable to lesions other than abscess. Pertinent discussion is given to the levels of the lung fissures as recognizable in the living and the value of accurate information in planning surgical approaches. Specific chapters are devoted to each lobe of both lungs, as well as to the entire lung and its variants. These chapters are well illustrated with conveniently placed pictures of metal casts of the bronchial tree, correlated with color plates of injected lung specimens and clear radiographic reproductions. A final chapter devoted to the preparation of specimens should be of value for those interested in preparing teaching material.

The format of this second edition is a marked improvement over the first edition published in January 1946. The chapter devoted to the middle lobe has been expanded to more completely present the middle lobe syndrome. The bibliography credits significant contributions to the study of bronchopulmonary anatomy since 1880. This monograph should be available to all physicians concerned with the diagnostic or therapeutic aspects of pulmonary disease.

—*THOMAS H. HEWLETT, Lt. Col., MC, USA*

CORRELATIVE NEUROSURGERY, by *Edgar A. Kahn,* M. D., *Robert C. Bassett,* M. D., *Richard C. Schneider,* M. D., and *Elizabeth Caroline Crosby,* Ph. D. 413 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $19.50.

In addition to the authors of this book there are 11 contributors, all of whose names are familiar to neurologists and neurosurgeons. It has been the aim of the authors to correlate neurosurgical technics with the ever expanding knowledge of the neuroanatomist, neurophysiologist, and biophysicists. It could hardly be expected that a correlation of such widely spread information could be completely attained in this one book, which is so practical and straight-forward; nevertheless, the authors have made an excellent step in that direction. The importance of good plain roentgenographic studies of the skull, of skillfully performed electroencephalography, and of direct, uncomplicated anatomic approaches to the surgical problems are all emphasized in this book.

This is a beautifully illustrated volume with some of the best halftone and line drawings that are to be found in any current neurosurgical work, and the authors, printers, and publisher are all to be complimented on the fine physical quality of this volume. It is a useful and practical book for the young neurosurgeon and is certainly to be recommended as a ready reference on any neurosurgical service where there are residents in training.—*JOHN MARTIN, Col., MC, USA*

THE DEVELOPMENT OF MEDICAL BIBLIOGRAPHY, by *Estelle Brodman,* Ph. D. 250 pages; illustrated. Published by Medical Library Association, 1955. Price $5. Send orders to: Archives Curator, Medical & Chirurgical Faculty of State of Maryland, Baltimore 1, Md.

All whose work in any way brings them into contact with medical literature and bibliography owe a debt of gratitude to Miss Brodman, the Assistant Librarian for Reference Services at the Armed Forces Medical Library. In a short but pleasantly written, highly documented essay the growth and development of printed lists of medical books and journals is well presented. The field is covered from Champier (in 1506!) to the present difficult situation with the scattered bulk of medical literature. Some 250 general bibliographies are listed and the authors of the more important ones described. The most pertinent section—The Present Situation—admirably covers a complex situation.

The book is well illustrated and indexed, and will prove interesting and helpful to many segments of the scientific population.

—*S. O. WAIFE, Lt. (MC) USNR*

THE CLINICAL PHYSIOLOGY OF THE LUNGS, by *Cecil K. Drinker*, M. D., D. Sc. 85 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $5.50.

This easily read, brief monograph is the outgrowth of many years of research by the author. The material was first given as a series of lectures and then assembled and amplified into its present form. The reader is taken naturally through a consideration of the arteries, the veins and capillaries, the bronchi and bronchioles, the nerves, and the lymphatics of the lungs, although discussion of gas exchange *per se* is omitted. The reader thus gains a clear concept of the anatomic physiology of the lungs and thereby a basic understanding of many disease processes in the lung. The easy prose and the constant repetition, with the integration and reintegration of each new idea presented, marks this as a fine teaching text. One regrets its brevity and that the author did not finish the pattern of lung physiology by adding the material on gas exchange he knows so well.

The illustrations are well done, as is the printing and binding. It is regrettable that this modest book may be so overpriced that it will fail to find a place in many personal medical libraries.

—*ALFRED H. LAWTON, M. D., Ph. D.*

SIMPLIFIED DIABETIC MANAGEMENT, by *Joseph T. Beardwood, Jr.*, M. D., and *Herbert T. Kelly*, M. D. 6th edition. 194 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $3.

This book for the diabetic patient presents in easily understood language the essential facts that he needs to know regarding his disease and its management.

The importance of diet and weight control, both as prophylactic measures and as treatment, is clearly and properly emphasized. The various complications, their warning signals, and their prevention are adequately described. The unit system of calculating the caloric and nutritive value of foods is explained and a conversion table is presented whereby the unit system may easily be converted into the exchange method recently released by the American Diabetic Association. The instructions for measuring insulin and the technic of injection are clear and concise, and are well illustrated with photographs.

The chapter on diabetic hygiene is not as well organized as the others. Under the heading of "Sweating Treatment" there is advice regarding the daily cleansing of the teeth, taking rest, and avoiding worry, including the statement that "it is of the utmost importance that the bowels move regularly at least once a day." Most authorities might question the statement regarding "utmost importance," especially because it might encourage an overly conscientious patient to fall into the cathartic habit.

These minor discrepancies do not, however, appreciably detract from the over-all worth of this excellent volume.

—*HUBERT H. CARROLL, Capt. (MC) USN*

MEDICAL TREATMENT OF MENTAL DISEASE, by *Daniel J. McCarthy*, M. D., LL. D., and *Kenneth M. Corrin*, M. D., with sections by *eight contributors*. 653 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $12.

The physician is more and more being exhorted to "consider the psychiatric aspects of the case" in reports published in medical journals dedicated to nonpsychiatric specialties such as surgery, gynecology, and internal medicine. This trend reflects the growing opinion in medical circles that a patient must be viewed as an integrated sociobiologic entity rather than as simply a cluster of juxtaposed organ systems. Unfortunately, these reports usually do not tell the conscientious reader desiring to mend his ways and to consider the psychiatric factors just how to go about it. The physician hears frequent reference to the "facts of life," but no one tells him what those facts are all about.

Sensing this need for specific information, the authors of this book have sought to present "the facts." By referring to appropriate chapters, the general practitioner (and the specialist too) will find both theoretic fundamentals and practical and detailed plans for managing each of the whole spectrum of psychiatric conditions, from the anxious patient, the hypochondriac, the psychosomatic problem, and the "functional" psychotic to the neurologic disorder with psychiatric effects.

In their eagerness to further the cause of the somatic approach to mental illness, the authors are often perhaps too busy criticizing the psychologic approach. Early in the book is much that is pedantic and sonorous. The style is platitudinous and full of generalizations; conclusions emerge from unclear logic and scantily or vaguely supported evidence; homilies and dogmatism are allowed to compete for attention with demonstrable facts.

Happily, this enthusiasm subsides after the first few pages and more objective discussion takes over. The reader should not trust his first impression. The therapeutic and forensic discussions in the main body of the book employ a balanced approach, giving both psychologic and organic technics their just due. The authors have made remarkable progress toward accomplishing their goals.

No other bound volume I know of does quite what this book does. One can anticipate that it will be to the general practitioner what Leo Alexander's *Treatment of Mental Disorders* is to the psychiatrist: a reference and guide to the use of organic therapy to supplement and enlarge psychotherapy. It can assist the team of psychiatrist, psychiatric social worker, psychiatric nurse and attendant, and clinical psychologist in both clinic and hospital; it should inspire collaboration between the psychiatrist and other medical specialists; and it will encourage the general practitioner trying to give broad-based therapy to his patients.

The subject is so extensive that in this single volume the authors must limit discussion of some of the sections to a summary or outline. Perhaps they should have only mentioned, or omitted entirely, some of the well-known organic illnesses, such as paresis, which are more thoroughly treated in books specifically devoted to the subjects, and thus saved space for more discussion of multiple attack on such problems as psychophysiologic diseases.

But all in all this book is clearly a significant contribution to medicine. The need for it is great; it does much to meet the need. And it shows the way further to broaden the approaches to medical diagnosis and therapy.—*WILLIAM F. SHEELEY, Lt. Col., USAF (MC)*

THE NURSERY SCHOOL, by *Katherine H. Read.* 2d edition. 297 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

This refreshing book reads almost like a text on the mental health of the nursery school child. The nursery school is identified as a human relationships laboratory wherein the day's activities are used as laboratory experiences in the study of children to promote the better understanding of human beings. The word "laboratory" is used in the sense of growth of learning, not only on the part of the child, but also of the teacher and parent. "Laboratory" is not intended to connote any scientific conditions of controlled study. The author acknowledges the complexities of human behavior and hesitates to propose any ready-made formulas for solving nursery school problems because "we realize that as yet we know only a little of all that we need to know about people."

Practical projects (homework) and carefully selected references are appended to each chapter. The book is punctuated with many photographic illustrations as well as selected, brief case studies which contribute heavily to the vivid portrayal of the behavior of children in the nursery school laboratory.

The author fulfills her responsibility in this new edition to continue to promote our understanding of children. This is important because "the kind of human beings we bring up will determine the kind of world we have . . . The responsibility belongs to all of us who bring up children." Miss Read writes well in an easy, descriptive style which will have wide appeal to a large lay audience.

—*FRANK KILLIAN, Jr., Lt. Col., USAF (MSC)*

WHEN MINDS GO WRONG, by *John Maurice Grimes,* M. D. 246 pages. The Devin-Adair Co., New York, N. Y., 1954. Price $3.50.

Throughout this book there is considerable animosity and indignation shown toward the American Medical Association, the psychiatric profession, private sanitariums, and state hospitals and their administrators. The author belittles many of the modern methods of established psychiatric practice, condemns the manner in which patients are treated in private institutions and in state hospitals, and quotes frequently

and at length accounts from patients attempting to show that the mentally ill are treated with sadistic violence, that well patients are confined to these hospitals against their will, and that the administrators of most state hospitals are bound by politics in their management of these facilities.

A lay reader of this book with no knowledge of the true conditions in most state hospitals and private sanitariums would undoubtedly form the impression that present methods of caring for the mentally ill are not much improved from those of medieval times. This book is so colored and biased by the author's apparent conditioned bitterness toward certain medical organizations and individual state hospital administrators that it can only do more harm than good.

—*GERALD W. SMITH, Capt. (MC) USN*

DOCTORS PHILATELIC, by *Oscar Gottfried.* 96 pages; illustrated. The American Physician, Inc., New York, N. Y., 1954. Price $5.

This book is indicative of the growing interest in "topical" stamp collecting in general, and in "medical" stamp collecting in particular. The author, who is the publisher of *The New York Physician,* has for quite some time edited a column in that magazine entitled "Medicine and Stamps." The publication has evolved from this column.

Medical stamps can, and do, include portrayals of hospitals, sanatoria, drugs, and nursing; also there are Red Cross and TB seals; but in this little volume of less than a hundred pages Mr. Gottfried has limited himself to stamps depicting men who in some way or other were connected with medicine. Walter Reed is obvious, the Congo Witch Doctor is inevitable, Gregor Mendel is welcome, but why such men, though great in their respective fields, as George Washington and Dante Alighieri? The author gives his reasons, but this reviewer is unconvinced.

Yet, if stamps of this type were limited only to famous doctors, there would not be the great wealth and variety of medical philately as exists today. Scientists like Pasteur, who did so much for medicine; William Henry Harrison, who studied medicine for but a brief time under Benjamin Rush, then, winning military fame, became ninth President of the United States; Georges Clemenceau, who though a full-fledged Doctor of Medicine won fame in the field of politics; Peter the Great of Russia, who, to quote the author: "While not a doctor, he is said to have operated on many of his subjects"; all these and many other "fringe" medical men contribute to the fascination of this particular branch of topical stamp collecting.

Collectors of medical stamps, and this is an understatement, will certainly, and for a long time to come, be indebted to Oscar Gottfried for his book.—*ROBERT WALKER DAVIS*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY, Volume III, The Human Adrenal Cortex, by editors for the Ciba Foundation: *G. E. W. Wolstenholme,* O. B. E., M. A., M. B., B. Ch., and *Margaret P. Cameron,* M. A., A. B. L. S., assisted by *Joan Etherington.* 665 pages; 227 illustrations. Little, Brown and Co., Boston, Mass., 1955. Price $10.

MANAGEMENT OF DISORDERS OF THE AUTONOMIC NERVOUS SYSTEM, by *Louis T. Palumbo,* M. D. 186 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $5.

HISTORY OF THE SECOND WORLD WAR, United Kingdom Medical Series. Editor-in-Chief, Sir *Arthur S. MacNalty,* K. C. B., M. D., F. R. C. P., F. R. C. S. THE ROYAL AIR FORCE MEDICAL SERVICES, edited by Squadron Leader *S. C. Rexford-Welch,* M. A., M. R. C. S., L. R. C. P., R. A. F. Volume I, Administration. 611 pages; illustrated. Published by Her Majesty's Stationery Office, London, E. C. 1, 1954. To be purfrom York House, Kingsway, London, W. C. 2. Price 70s. net ($12.60).

SURGERY OF THE ALIMENTARY TRACT (Bickham-Callander) in three volumes, by *Richard T. Shackelford,* M. D., assisted by *Hammond J. Dugan,* M. D. Volume I, Esophagus, Stomach and Duodenum, Liver, Gallbladder and Extrahepatic Biliary Ducts, pages 1-862; Volume II, Pancreas, Spleen, Small Intestine (Jejunum & Ileum), Peritoneum, Omenta and Mesentery, and Colon, pages 863-1,634; Volume III, Anorectal Tract, Excisions of The Rectum, Hernia of the Gastrointestinal Tract, and Incisions, pages 1,635-2,575. 1,705 illustrations. W. B. Saunders Co., Philadelphia, Pa., 1955. Price $60 for three volumes.

A TEXTBOOK OF MEDICINE, edited by *Russell L. Cecil,* M. D., Sc. D., *Robert F. Loeb,* M. D., Sc. D., D. Hon. Causa., LL. D., and Associate Editors, *Alexander B. Gutman,* M. D., Ph. D., *Walsh McDermott,* M. D., and *Harold G. Wolff,* M. D. 9th edition. 1,786 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

THE MASK OF SANITY, An Attempt to Clarify Some Issues about the So-Called Psychopathic Personality, by *Hervey Cleckley,* M. D. 3d edition. 596 pages. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $9.50.

MEDICAL AND PUBLIC HEALTH LABORATORY METHODS. Successor to Fifth Edition of Laboratory Methods of the United States Army. Edited by *James Stevens Simmons,* M. D., Ph. D., Dr. P. H., S. D. (Hon.) and *Cleon J. Gentzkow,* M. D., Ph. D. 1,191 pages; 115 illustrations and 9 plates in color. Lea & Febiger, Philadelphia, Pa., 1955. Price $18.50.

THE SPINE, A Radiological Text and Atlas, by *Bernard S. Epstein,* M. D. 539 pages; 721 illustrations on 331 figures. Lea & Febiger, Philadelphia, Pa., 1955. Price $16.50.

FOREIGN ANIMAL DISEASES, Their Prevention, Diagnosis and Control. Official Report of the United States Livestock Sanitary Association, 1954. Copies may be purchased from the Secretary-Treasurer, U. S. Livestock Sanitary Association, 1 West State St., Trenton, N. J. Price: $1.00 single copy; 2 to 50 copies, 75 cents each; 51 or more copies, 60 cents each.

THE STRUCTURE, COMPOSITION AND GROWTH OF BONE, 1930-1953. A BIBLIOGRAPHY. Compiled by *Marjory C. Spencer,* Bibliographer and *Katherine Ubler,* Reference Librarian, Armed Forces Medical Library, Reference Division. Publisher: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., March 1955. Price $1.

THE HALOGENATED ALIPHATIC, OLEFINIC, CYCLIC, AROMATIC, AND ALIPHATIC-AROMATIC HYDROCARBONS INCLUDING THE HALOGENATED INSECTICIDES, THEIR TOXICITY AND POTENTIAL DANGERS, by *W. F. von Oettingen,* M. D., Ph. D. Public Health Service Publication No. 414. 1955. For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $2.50.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION, Volume XLVI, 1954, edited by *Richard M. Hewitt,* M. A., M. D.; *A. B. Nevling,* M. D.; *John R. Miner,* B. A., Sc. D.; *James R. Eckman,* A. B., M. A., Ph. D.; *M. Katharine Smith,* B. A.; *Carl M. Gambill,* A. B., M. D., M. P. H.; *Florence Schmidt,* B. S. E.; and *George G. Stilwell,* A. B., M. D. 843 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

PATHOLOGY FOR THE SURGEON, by *William Boyd,* M. D., F. R. C. S., F. R. C. P., M. R. C. P., F. R. S., LL. D., D. Sc. (Man.), M. D. (Oslo). 7th edition. 737 pages; 547 illustrations including 10 in color. W. B. Saunders Co., Philadelphia, Pa., 1955.

DENIAL OF ILLNESS, Symbolic and Physiological Aspects, by *Edwin A. Weinstein,* M. D., and *Robert L. Kahn,* Ph. D. American Lecture Series, Publication No. 249, A Monograph in The Bannerstone Division of American Lectures in Neurology. Edited by *Charles D. Aring,* M. D. 166 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $4.75.

PRACTITIONERS' CONFERENCES Held at The New York Hospital-Cornell Medical Center. Volume I, edited by *Claude E. Forkner,* M. D., F. A. C. P. 411 pages; 15 illustrations. Appleton-Century-Crofts, Inc., New York, N. Y., 1955. Price $6.75.

BASIC NURSING, revised by the *Teaching Staff of the Household Nursing Association,* Boston, Mass., and edited by *Helen Z. Gill,* R. N. 4th edition. 749 pages; illustrated. The Macmillan Co., New York, N. Y., 1955.

OBSTETRICS, by *J. P. Greenhill,* M. D. 11th edition. 1,088 pages; 1,170 illustrations on 910 figures, 144 in color. W. B. Saunders Co., Philadelphia, Pa., 1955.

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